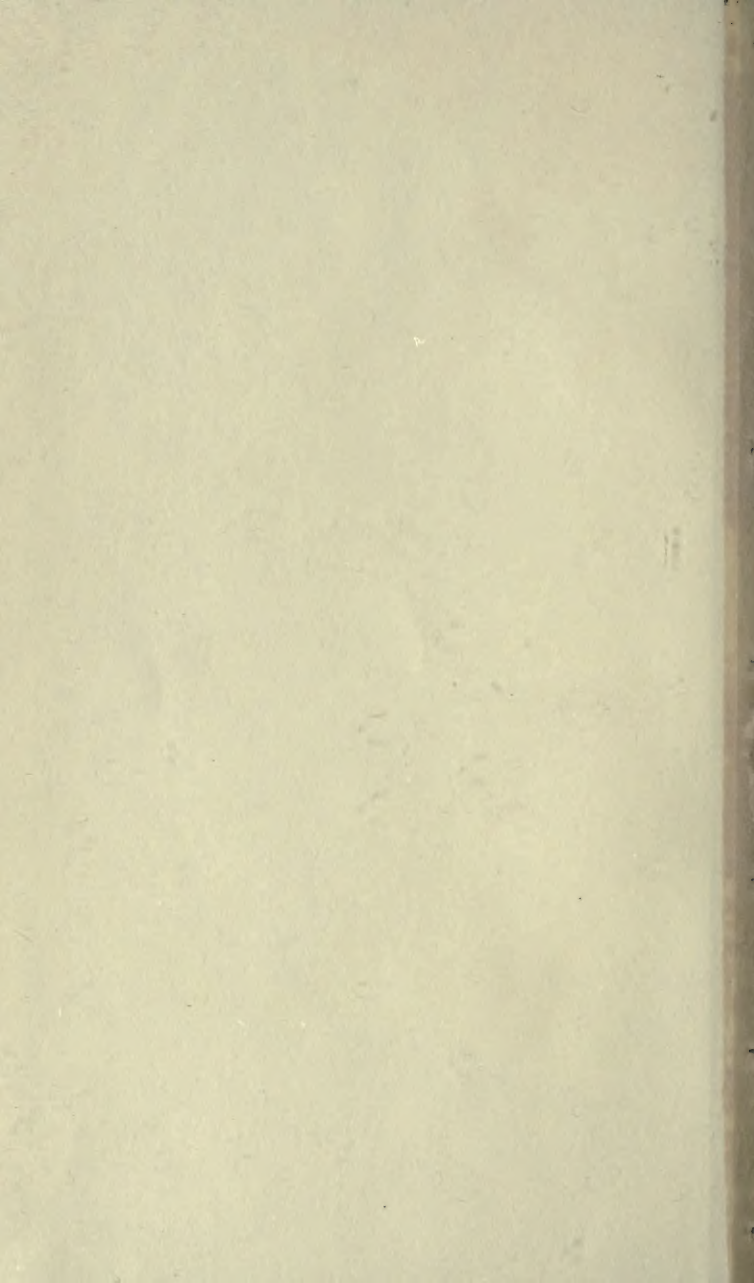




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COMMERCIAL GEOGRAPHY

AN
INTERMEDIATE TEXT-BOOK

BY

ALEX. L. CURR, B.A. (LOND.)

SOMETIME LECTURER ON COMMERCE AND COMMERCIAL GEOGRAPHY IN THE
QUEEN'S UNIVERSITY OF BELFAST

WITH ONE HUNDRED AND FIFTY MAPS
AND DIAGRAMS IN THE TEXT

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PREFACE

THE issue of a new geography during the world's greatest struggle may seem inopportune ; but much labour and expense had been incurred in the completion of the book when war broke out, and the publishers' choice lay between delay, with possible prejudice to many of the diagrams in particular, and immediate publication. A delay for some months was considered wise, but now it has been decided to issue the book. After all, in a *commercial* geography, one's studies lead up to the estimation of the capabilities of a region for production ; and mere change of political ownership does not, as a rule, affect this.

This book is designed for senior work in Secondary Schools, and for intermediate work in Technical Colleges and Universities. The first chapter has been written with the double object of supplying the desirable minimum of economic knowledge, and of ensuring the revision of physical principles of which a thorough comprehension is vital. Commercial Geography is not a mere "cramming" of facts, but a rational study of conditions and tendencies ; and the necessity for emphasising this has led the author to discuss many points seldom dealt with.

The requirements of modern geographical method have been kept carefully in view, and an attempt has been made to harmonise "regional" treatment with the necessary consideration of political units. Questions, which have been added at the end of each chapter, should provide a useful basis for revision ; and many others of a similar nature will occur to the teacher.

The free introduction of maps and diagrams is not intended to supersede the atlas, which should be always by the student's side ; and he should be encouraged to trace tendencies towards change by constant reference to the various Statistical Abstracts issued by the Board of Trade. Such exercises make no inordinate demand upon either time or ability, and are of the utmost value—in conjunction with a rational text-book—from the educative point of view.

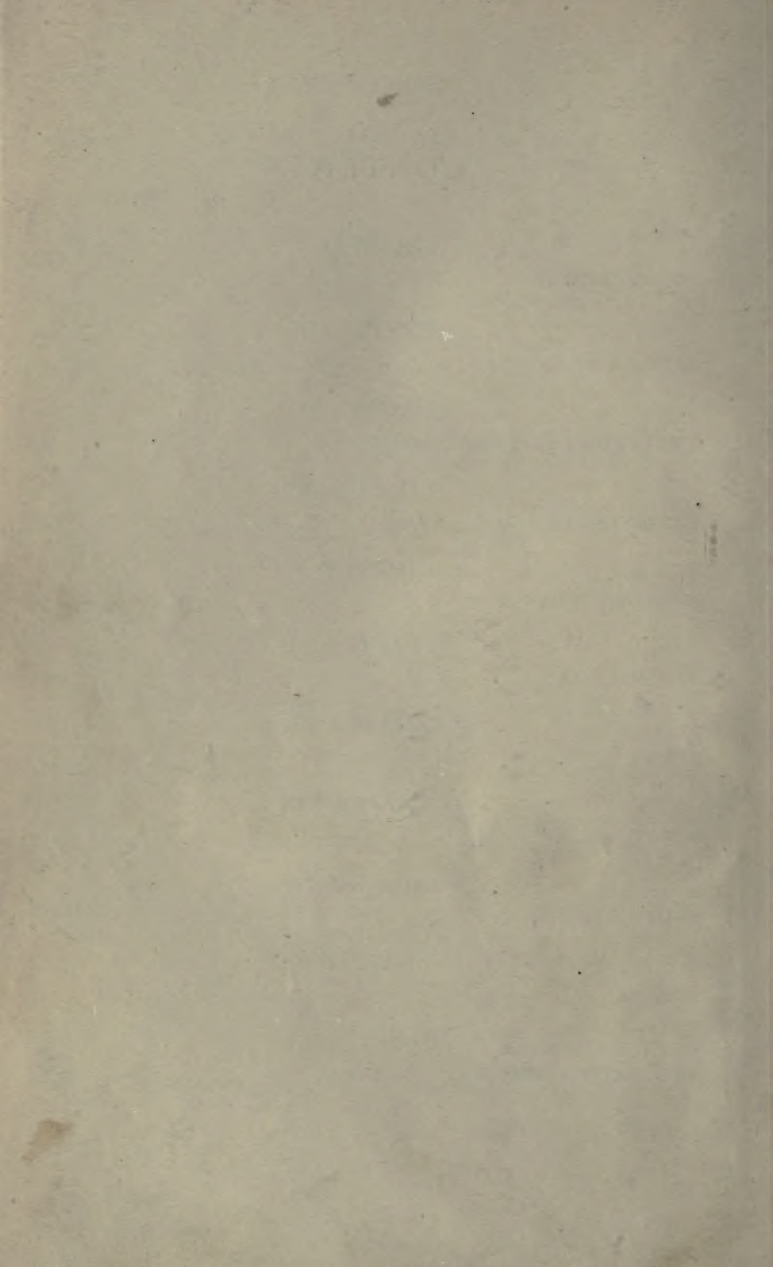
The author's grateful acknowledgments are due to Professor L. W. Lyde, M.A., of University College, London, for much inspiration and kind advice ; to Professor F. T. Lloyd Dodd, B.A., B.Sc., of the Municipal Technical Institute, Belfast, for invaluable assistance in many ways ; and to Mr. J. F. Rees, M.A., of Edinburgh University, for kind help in the reading of proofs. A special acknowledgment of indebtedness is also due to Mr. Geo. G. Chisholm's indispensable *Handbook of Commercial Geography*, without which the preparation of a new book on the subject would entail infinitely greater labour.

ALEXANDER L. CURR.

April, 1915.

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INTERMEDIATE COMMERCIAL GEOGRAPHY

CHAPTER I

INTRODUCTORY

1. Two main influences determine the existence, the nature and the direction of commerce—**supply** (*i.e.*, production) and **demand** (*i.e.*, for consumption). The links binding the two are transport and exchange. Commercial Geography treats of geographical conditions in their relation to these various aspects of commerce.

2. **Production** involves two distinct processes, the finding of the raw material, and its preparation or manufacture for consumption. Raw material may be of animal, vegetable or mineral origin. As all animal life depends directly or indirectly upon vegetation, it is readily seen that all products except minerals depend absolutely upon climate and fertility of the soil; and, as most soils possess more or less fertility, which may be artificially increased as required, climate is the main influence. The location of minerals depends primarily upon geological formation, an aspect of the subject which falls more particularly within the scope of

Geology; in a work on Commercial Geography, therefore, minerals can be adequately dealt with only in relation to geographical and economic conditions tending to promote or hinder their extraction and distribution.

3. The development of manufactures in different localities is the outcome of a combination of influences: accessibility of raw material, proximity of markets for the finished product, local sources of power and supplies of labour, and sometimes, as in the case of textile manufactures, even climatic conditions. All of these considerations have their place in the study of Commercial Geography.

4. **Demand** is best understood by a study of geographical conditions in their relation to human life. Man's wants fall naturally under three heads—food, clothing and shelter. In a tropical land, where Nature is exceptionally bountiful with her gifts, his wants are few and easily satisfied. The vegetation around him furnishes him with materials with which he can construct all the shelter he requires in a few hours at the most; the temperature calls for the scantiest of attire of the simplest nature; and practically his one occupation is that of hunting for animal food with which to vary the wealth of vegetable food which is ever at hand. But, in a temperate land like our own, clothing and shelter are matters of supreme importance, and are necessarily of a more substantial and enduring nature; while food of a more sustaining kind and in greater quantity is necessary to maintain the body. Man is thus a heavier consumer in temperate regions, while his land is less exuberantly productive; and the point at which the produce of the land ceases to suffice for the support of the increasing population is reached much

sooner in a temperate than in a tropical land. It is in the tropics, therefore, that we expect to find the greatest available surplus of produce for export.

5. Commodities are **transported** from one place to another by land or water. Inland transport is conducted by river and canal, road and rail. The first transport was overland, where not even a track existed to guide it. Its regularity soon produced well-worn tracks—the origin of roads. Rivers were used at an early era, at first for floating goods down-stream, and later for boats propelled by oar and sail, by means of which up-stream journeys might be made. The perfection of river transport, the growth of manufacturing, and the necessity for fuller and freer transit between manufacturing centres and markets led to the cutting of canals; and the application of steam power to locomotion, and the lessons drawn from experience as to the value of canals led to railway construction. Oversea transport was limited until distances were largely conquered by steam propulsion.

CLIMATE

6. We have seen that production of raw material of animal or vegetable origin depends mainly upon climate [2], while the growth of certain industries in particular localities and the demand for commodities are to a large extent dependent upon the same influence [3, 4]. A brief review of our knowledge regarding climate will therefore be desirable as a preliminary to our rational study of Commercial Geography. **Climate is the average weather** of a particular locality or region; and the elements entering into it are temperature, moisture, sunshine and wind.

7. **Temperature** varies with latitude, being highest where the sun's rays strike perpendicularly upon the earth—*i.e.*, within the tropics. If [Fig. 1] we represent a given width of sunbeam by the space between the lines AB and CD, the width of the tropical land heated by it in its perpendicular descent would be represented by the line BD. In a higher latitude a similar width of sunbeam, represented by the space between the lines EB and FG, striking the earth at a sharper angle, would cover a greater width of land, BG, each part of which would thus receive less *direct* heat than a part of

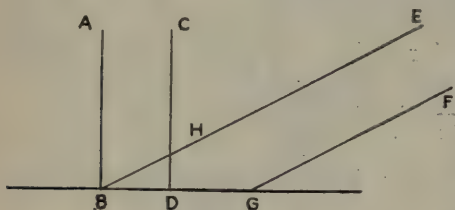


FIG. 1.

equal size within the tropics; and the lowest temperature would naturally be looked for in the polar regions, where the angle of incidence of the

sun's rays is least. In a particular latitude, however, temperature varies with altitude, there being an approximate fall of 1° F. for every 300 feet of ascent. It is thus evident that, even where the sun strikes perpendicularly, altitude may neutralise the heat—as, *e.g.*, on the plateau of Ecuador, where the great height makes it possible to grow wheat and other temperate products under the equator. A tropical mountain [Fig. 2] will also display on its sides all grades of vegetation, from the tropical jungle that surrounds its base to the arctic mosses and lichens that can just survive on the margin of the snow that caps the summit.

8. Temperature also depends upon prevailing winds, which may be warm or cold, dry or wet; and upon the

proximity or remoteness of a large sheet of water. Surface water gains and loses heat much more slowly than land, owing to its superior conductivity which allows heat to pass more quickly to greater depths and *vice versa*. When the land is being quickly heated in summer, therefore, by the sun's rays, the proximity of a large sheet of water will moderate the temperature of the land bordering upon it, just as, by slowly radiating its accumulated store of heat, it will moderate the cold of

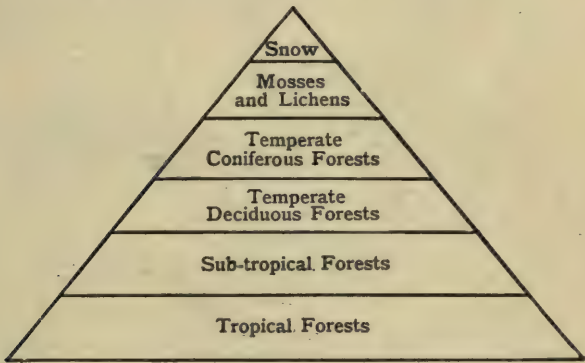


FIG. 2.—ZONES OF VEGETATION ON TROPICAL MOUNTAIN.

the adjacent land in winter. The import of this will be realised on comparing, *e.g.*, the January and July isotherms of Europe [Figs. 115 and 116]. The extremes of temperature in central Russia are notable when compared with the more moderate variations in the same latitude in western Europe. A climate like that of Russia, remote from the moderating influence of the ocean and subject to extremes of temperature, is termed "**continental**," as opposed to an "**oceanic**" or "**marine**" climate, which is largely affected by oceanic influence.

9. Temperature may also be affected by ocean currents. The cold Labrador current [Fig. 3] is partly responsible for the Arctic winter of the Labrador coast in the same latitude as the British Isles, whose shores are kept free from ice by the warm North Atlantic drift;¹ and the cold Kurile current has a similar influence upon the climate of western Japan, in the same latitude as sunny Spain.

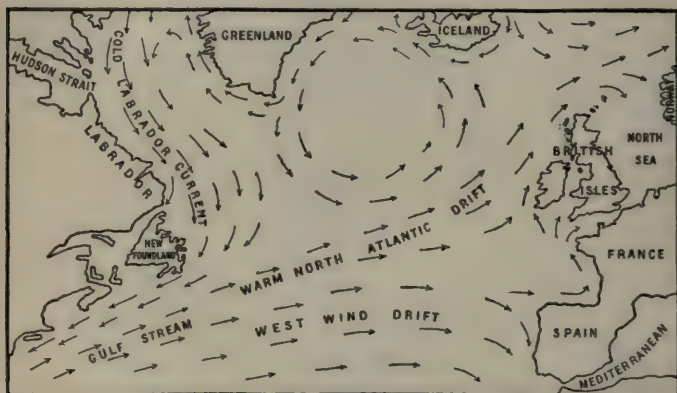


FIG. 3.—NORTH ATLANTIC CURRENTS.

10. Rainfall is attributable to the dual influence of wind and topography. Disregarding neutral winds, which belong neither to the one category nor to the other, winds may be said to be either "water-bringers" or "water-drinkers." The former generally come from over a warm sheet of water subject to steady evaporation, and are laden with water-vapour ready for precipitation when subjected to cooling. If, on reaching the land, these winds are forced to rise in order to cross mountains [Fig. 4], the moisture-laden air of which

¹ Caused by the prevailing south-west winds [14].

they consist expands on rising into a less dense atmospheric stratum, becomes cooled in the process, and condensation and rainfall result. The most notable example of this is the heavy rainfall (almost 500 inches per annum) deposited by the winds of the summer monsoons on the great mountain slopes of Assam. But, if no mountains are met with by the winds in their passage inland, condensation will occur only if the land over which they pass is cooler than the water from which they have come; and that, as a rule, will



FIG. 4.—EFFECT OF VERTICAL RELIEF ON RAINFALL.

be only at night or in winter, when the real tendency of the wind is to blow seaward [15, 16].

II. "Water-drinkers," on the contrary, carry little water-vapour, and usually come either from a cold sheet of water, from which little evaporation can take place, or overland, and are then ready, when heated, to absorb and carry away every trace of moisture they can find. Thus the summer "Etesian" winds from over the Mediterranean—a sea too narrow to afford them any great amount of moisture—become gradually hotter as they travel south, until, on reaching the Sahara, they are ready to absorb far more moisture than the parched soil can yield.

12. **Sunshine** is also an important factor in climate—so important that its absence may either make or mar the productivity of a region. Thus a consistently cloudy sky in a low latitude may enable a compara-

tively porous soil to be productive by protecting it from the rapid evaporation which would result from bright sunshine; while in a high latitude it may, by obstructing the sunshine, render the climate too cold and moist for the production of anything but grass and forest. In high latitudes, too, the winter day is exceedingly short and the summer day correspondingly long. This has an important influence upon production, as the length of the summer day, if conditions otherwise are suitable, will enable grain to ripen even within the Arctic Circle, as in Norway.

13. Climate is dependent not only upon temperature, moisture and sunshine, but also upon **wind**; and there are regular wind-systems which call for mention. Round the world there stretch two "belts" of atmospheric density or high-pressure—one to the north of the equator and the other to the south—each causing an outflow of air equatorwards and polewards. Each of these belts in its winter season draws nearer to the equator, receding from it as summer approaches; but their average positions may be said to lie roughly 35 degrees north and 30 degrees south of the equator. The equatorward air-currents are known as "Trade Winds," and the poleward as "Anti-Trades" [Fig. 5]. But these winds do not blow directly north and south. The earth is continually rotating on its axis, and the equator, being farthest from the axis, is travelling round from west to east more rapidly than any other part of the earth's surface. The Trades, in moving towards the equator, therefore, are not rotating so fast as the land they pass over, and thus appear to be deflected towards the south-west and north-west respectively. For a precisely contrary reason—viz., that when they reach higher latitudes the Anti-Trades are rotating

faster than the earth's surface itself at those latitudes—these winds appear to blow towards the north-east and south-east respectively.

14. These regular winds play an important part in the climate of the lands on which they blow. Thus the S.W. Anti-Trades are of the utmost benefit to western Europe, carrying moisture—particularly in spring—and comparative warmth in winter, besides causing the warm surface-water of the Atlantic to drift ceaselessly against her shores [Fig. 3]; while the S.E. Trades, blowing away from the west coast of South America, are primarily

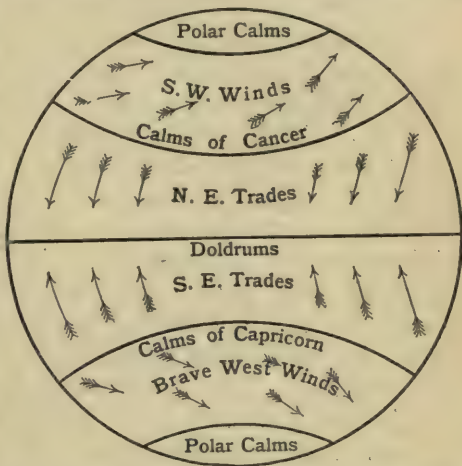


FIG. 5.—THEORETICAL CIRCULATION OF WINDS.

responsible for the Atacama Desert and the aridity of the coast from the Gulf of Guayaquil almost to Valparaiso, the N.E. Trades being similarly mainly responsible for the deserts of Lower California.

15. **Monsoons** are seasonal winds having a predominant effect upon climate, notably in Asia. The interior of the continent in summer is the seat of a vast low-pressure area, due to the intense heat and consequent expansion and rising of the air; and the steady inflow of moisture-laden currents from over the Indian and

Pacific Oceans, to take the place of the rising air, results in a heavy rainfall on all the seaward slopes of south-eastern Asia [Fig. 51]. This inflow comes so regularly and continues so steadily that it can almost always be depended upon to bring rain in summer when it is most necessary. In winter exactly opposite conditions hold good. The "continental" climate [8] confers upon central Asia an extreme of cold unknown in any other region, causing a corresponding density of the air and a consequent outflow in all directions, the low-pressure areas being now situated over the oceans [Fig. 49]. Coming from over the cold, dry land, this winter monsoon is cold and dry and bracing, but it is hardly so regular and steady as the summer monsoon.

16. Land-and-sea breezes are daily monsoons in miniature, which are often met with at the coast, and are particularly regular, *e.g.*, on the coast of Syria. During the daytime, as has been seen [8], the land surface becomes more rapidly heated than that of the sea, and the air above it, becoming also heated, expands and rises, to give place to an inflow of cooler air from the sea. At night the land surface cools as rapidly, while the sea slowly radiates its store of heat, so that the cooler and denser air over the land flows outward towards the area of less density over the sea. Such land-and-sea breezes, in the absence of any disturbing cause, are as regular in their alternation as the Asiatic monsoons.

17. Irregular winds are a serious factor in many climates—as, *e.g.*, the cold wind which occasionally sweeps over the interior of North America from the Arctic regions and at times blights even the orange-groves of Florida with its icy breath. The presence of a mountain barrier in the north to shelter the continent

from such winds would be an inestimable boon—as, *e.g.*, the Himalayas are to India.

SOIL

18. Fertility of the soil is an important factor in production. Mountainous regions, if not forested, are usually rocky and barren, having been denuded by the weather of their earthy covering; but occasionally they retain just sufficient soil to support an outer coat of heathery scrub or moss or poor grass. The soil removed by denudation has been carried down by rain and wind and spread over the level lands below, which owe their depth of soil and fertility mainly to these deposits. Even the rocky mountain surface itself is continuously being broken up and pulverised by the action of rain and frost, and the resulting soil—consisting largely of decomposed mineral matter rich in plant food—is carried down in the manner indicated and increases or renews the fertility of the lands below. An excellent instance of the effect of this “weathering” of mountains is to be found in the valley of the Po in northern Italy, which is deeply covered with *débris* carried down from the Alpine slopes.

19. The lower slopes of a mountain may support a vegetation almost as luxuriant as that surrounding its base. Where it is exposed to regular “water-bringers” [10], as are the western mountains of British Columbia and the Southern Alps of New Zealand, the windward slopes are heavily forested, while the leeward slopes are dry, and fit for little but pasturage. Chalk or limestone strata by their porous nature largely resist denudation, and tend to remain as hills or “downs” [Fig. 6], as in southern England, long after more recent surface layers have been removed. The only vegeta-

tion they support is a short, wiry grass, forming the best grazing for sheep reared for their wool.

20. Soils in which clay predominates are extremely non-porous, and very tenacious of moisture. They are thus generally an advantage in a hot, dry climate, and the reverse in a cold, wet climate. Sandy soils, on the contrary, being extremely porous, are frequently an advantage in a cold, wet climate, allowing excessive moisture to pass away, and a serious drawback in a

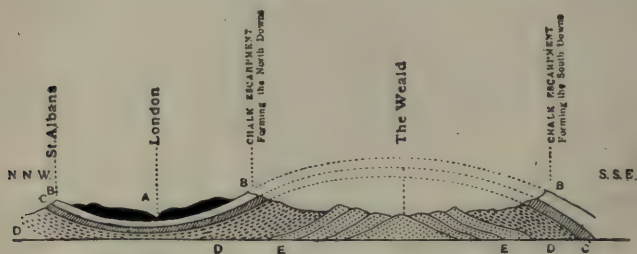


FIG. 6.—SECTION ACROSS SOUTH-EAST ENGLAND.

A=London clay.
BB=Chalk.
CC=Lower greensand.

DD=Weald clay mainly.
EE=Hastings sand.

The dotted lines indicate the original upfold of the rocks before erosion took place.

hot, dry climate, almost inevitably becoming desert. Sandy soils are frequently deficient in plant food, and a reddish soil of this nature, known as “laterite,” is particularly barren. Where the soil is sufficiently fine and the climate sufficiently dry, the wind will sometimes transfer the former in clouds from one place to another; and where such winds are constant they will largely affect the fertility of the region towards which they blow. Thus in northern China the native soil is buried under an extraordinary depth of fertile “loess,” or fine, yellow, mineral soil, brought by the winter monsoons

from the dry desert interior of Mongolia and spread over the country.

21. Soil of volcanic origin is usually of great fertility, as is also the vegetable mould of forest lands upon which the autumn leaves of centuries have fallen and decayed. The north-west of the Deccan owes its exceptional fertility entirely to its volcanic nature; and forest "clearings" on the slopes of the Brazilian highlands are richly productive of fine coffee. But there are forest lands which are not fertile. In a dry climate fallen leaves do not mould, but dry up and crumble away or are blown away. Moisture is essential, and snow assists greatly in the formation of vegetable mould; and the action of earthworms, which continually rise from underlying soil and deposit "earth-casts" on the surface, is of the utmost value.

22. Deltaic areas are exceptionally fertile, consisting of the very finest sediment brought down by rivers from the mountains and deposited on the coastal plains through which they enter the sea, the coarser sediment having been previously deposited at higher levels. The finest example of this is probably to be found in Lower Egypt, as the deltaic region of the Nile is called.

ARTIFICIAL INFLUENCES

23. It has already been mentioned that fertility is of no avail if the climate is unfavourable to cultivation. Arctic conditions will condemn the richest soil to sterility just as effectively as excessive drought does in the case of the Sahara. Whole regions of North America on the leeward side of the Rocky Mountains, where the rainfall is too slight for agriculture, were entirely given over to cattle-ranching and sheep-rearing, until, within comparatively recent years, it has been

found that they may, by irrigation or "dry farming," be made to produce the finest "hard" wheat.

24. **Irrigation** is the moistening of the soil with water led across it in specially constructed channels or trenches from a river, lake or other source of supply. **Dry farming**, on the other hand, implies the preservation of moisture in the soil by covering it with a layer of material—often small stones—which keep the sun's rays from beating directly upon the soil, and which in itself is non-absorbent and so does not draw the moisture to the surface where it would quickly evaporate. The protecting layer, known as a *mulch*, may even consist of a certain depth of the soil itself which is continually stirred by ploughing and harrowing, and so possesses the necessary characteristics. The agricultural development of western North America is a notable instance of what human effort can do to overcome drought, as are also the wonderful irrigation systems of India and Australia; but such irrigation is possible only where there already exist rivers or lakes whose waters can be artificially diverted, or where water is obtainable by sinking wells, as in China, or by conserving the rainfall in tanks, as in the Deccan.

25. But while Man has thus frequently succeeded in overcoming drought, he has not been able to overcome unsuitability of temperature, except by a heavy expenditure on **glass-houses**; and the cost of culture under glass restricts its application to products representing considerable value for a small space—*e.g.*, grapes and ornamental palms in cool, temperate lands; or to "out-of-season" products which will bear a high price—*e.g.*, early fruits and flowers.

26. But he is most successful in his efforts to increase the fertility of the soil. He has studied the chemical

composition of plant food, and discovered that different plants withdraw as food different elements from the soil. By artificially restoring those elements and by "rotating" his crops he can avoid that exhaustion of the soil which repeated withdrawal of the same elements by the same crops would produce. **Rotation of crops** is thus recognised as vital in any successful system of agriculture, since more manure—*i.e.*, more expense—is necessary to repeatedly produce the same crop than is necessary to maintain fertility under a judicious system of rotation. The latter will generally be adopted, therefore, in all but exceptional circumstances (*cf.* jute in India, § 389).

INDUSTRY

27. In a primitive state of civilisation each man, by his own efforts, supplies himself with food, clothing and shelter. In a more advanced state the beginnings of what is known as the "**division of labour**" are noticeable. Whereas each man formerly made his own boots and clothes, built his own house and grew his own crops, one man will now make boots only, another will make nothing but clothes, others will confine their labours to the building of houses, while others, again, will spend their whole working day on agriculture. By exchange or barter each will then be able to obtain from the others, in exchange for the surplus results of his labour, the proportion of the results of their labour of which he stands in need. The main advantages of this are twofold: in the first place, each man becomes by practice more expert in his one branch of labour, so that the whole requirements of the community are produced by a much less total expenditure of labour—*i.e.*, more economically—than under the

primitive system by which each man supplies his own wants; and, in the second place, the production of commodities may be restricted to localities which are more fitted by conditions—geographical and otherwise—for their production.

28. With the introduction of machinery processes of labour were gradually simplified and improved, and the harnessing of water-power, which substituted the energy of falling water for human exertion as the motive power, greatly increased the capacity for production, so that one man might now operate several machines each of which would do more work mechanically and accurately in a given time than he could formerly perform with his hands. The invention of steam-power was but another step in the direction of increased efficiency, and the division of labour was gradually carried to greater lengths until at the present day in a boot-factory one man will have nothing to do but cut certain parts from the leather to a given shape, another will spend his time running a machine knife round the edges of the rough soles, and so on throughout the hundred or more processes which have to be performed before the finished boots appear. The economy resulting from such a division of labour is great; it is estimated that a pair of boots, hand-made, take on an average $14\frac{1}{2}$ hours to make and cost about 16s., while a pair of machine-made boots take but $1\frac{1}{2}$ hours and cost but 1s. 5d. to make.¹

GEOGRAPHIC CONTROL

29. The restriction of certain industries to particular localities results largely from geographic control, or the

¹ See Foster Fraser's "America at Work," p. 205.

influence exerted by geographical causes, such as climate, distribution of minerals, etc. Thus localities peculiarly adapted for the production of a certain commodity will—in the absence of counteracting causes—collectively produce sufficient of that commodity to satisfy the entire requirements of the world, exchanging the surplus production for other necessary commodities which other localities are geographically more fitted to produce. The cotton manufactured in Lancashire is produced in lands climatically suited for cotton-growing, while the moist atmosphere of Lancashire is peculiarly adapted in turn for its manufacture.

30. It will generally be found that in countries rich in coal, especially if iron occurs in close proximity, much of the energy of the inhabitants is devoted to manufacture, as in the British Isles and central Europe; while in countries deficient in coal man's main activities take such other forms as conditions favour—as, *e.g.*, agriculture on the rich, warm lands of India, and dairying in the cool, moist climate of Denmark.

TARIFFS

31. Conditions of production may be artificially influenced by tariffs. Thus, by the imposition of a sufficiently high tariff or import duty on all imported wheat, Britain might bring about a rise in the price which would lead to the resumption of extensive wheat cultivation in the country. The British wheat-growing industry in such a case would be said to be “protected,” and the duty would be known as a “protective” tariff. Such tariffs are in force in many countries—as, *e.g.*, in Germany, France, and the United States—but the bulk of the duties are imposed with the object of protecting

manufacturing industries. The system employed by Britain is based on the principle that no import tax is placed upon a commodity which can be produced in the country without at the same time an excise tax of equal amount being exacted from the producer or manufacturer. The foreign manufacturer thus competes in the British market on equal terms, whence the designation of the system as "Free Trade." ✓

LOCALISATION OF INDUSTRIES

32. Just as a country will devote its energies to those forms of production for which it is most suited, so will the industries of a particular locality be those for which it possesses the greatest facilities. In the days of **water-power** an industry could grow only where water-power was obtainable, and the particular form which the industry might take would depend largely upon the relative ease of obtaining different forms of raw material and upon the accessibility of the market for the finished product. Thus the proximity of the prairie wheat-fields and facility for shipment down the Mississippi led to the growth of the huge flour-milling industry at the Falls of St. Anthony, which forms the basis of the prosperity of the city of Minneapolis.

33. With the introduction of **steam-power** the establishment of industry secured a certain amount of elasticity, due to the possibility of transporting coal, the source of the power. But coal transport quickly adds to the cost of steam-power, so that in practice it is the exception rather than the rule to find industries established at any great distance from the source of coal supply. Industries are, in fact, said to be "attracted" to coal-fields. Thus the great twin industries of cotton and wool are found firmly established on the coal-fields of

Lancashire and Yorkshire respectively, on opposite slopes of the same section of the Pennine elevation, where the moist air specially favours textile manufacturing, and local supplies of the finest wool are abundant and raw cotton and wool imports convenient. Very often, where coal is readily accessible, the presence of local raw materials will decide the form which industry will take, as in the case of the Yorkshire woollen industry already mentioned. Thus on most British coal-fields iron is also found, so that iron and steel manufacture is general; while at Sheffield, where both iron and coal occur, the presence of millstone grit led to specialisation in cutlery. Other industries, again, arise out of a combination of local circumstances—*e.g.*, the proximity of the cattle-ranches to the “maize belt” of North America led to the great stock-fattening, slaughtering and canning industries of Chicago, St. Louis and other cities, whence the meat was conveniently shipped.

POPULATION AND LABOUR

34. The attraction of industries to coal-fields referred to in the preceding paragraph frequently results in the migration of population to the new industrial centres from areas of less activity. **The establishment of an industry thus tends to increase the density of the population** of a district. This tendency is clearly shown by population maps of Britain at different periods. Before the Industrial Revolution¹ (1760-1830) the area of greatest density lay on the fertile

¹ The term employed to denote the process of transformation by which “domestic” industries (*i.e.*, conducted at home) gave place to the factory system on the application of mechanical power to manufacturing processes.

agricultural plain of south-eastern England [Fig. 7], while at the present day the areas of greatest density—with the exception of the Metropolitan commercial area—tend to coincide with the coal-fields, particularly in the Lancashire cotton district [Fig. 8].



FIG. 7.—DISTRIBUTION OF POPULATION IN ENGLAND AND WALES IN EIGHTEENTH CENTURY BEFORE THE INDUSTRIAL REVOLUTION.

35. But, powerful as the attraction of industry is, it cannot attract a population which does not exist. Thus it would be futile to establish factories in frigid Greenland or in the torrid deserts of central Australia, even if the coal existed there and it were possible otherwise

to do so, as no local populations exist from which labour might be drawn and climatic conditions exclude European labour. Gold-mining, an apparent exception, is an industry in quite a different sense; the population attracted consists almost entirely of men to whom

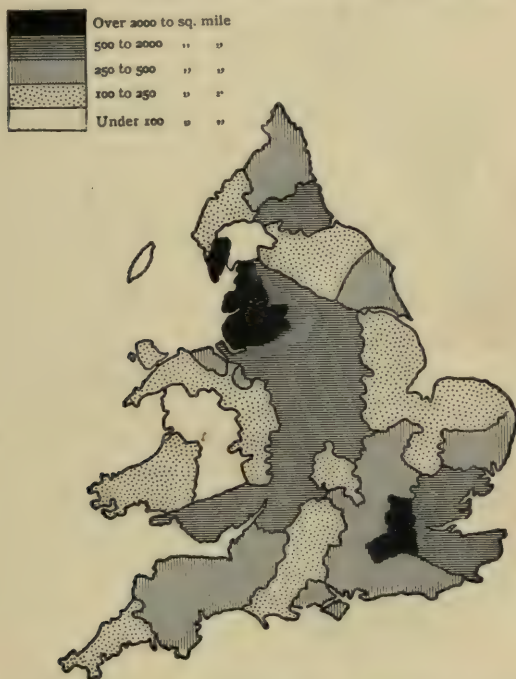


FIG. 8.—DISTRIBUTION OF POPULATION IN ENGLAND AND WALES IN 1906.

speculative possibilities compensate for all physical drawbacks. On the other hand, even where there is an available population, it is not always possible to induce the people to undertake industrial labour. This is frequently the case in the tropics, where the

necessaries of life are so easily obtained that there is little or no inducement to incur the unpleasantness of physical labour in a hot climate for the sake of a pecuniary reward which can add little or nothing to the pleasantness of life.

GOVERNMENT

36. Nor can industry thrive without security and stability of government. Thus almost perpetual political unrest has hampered the development of most South American states, as the money necessary to development is not forthcoming for industrial or commercial ventures which are liable to be ruined or at least seriously damaged at intervals by revolution or war; while the defective government of the Turkish Empire continues to keep it in a hopelessly backward condition. China, also, although possessing, perhaps, the largest and richest coal-fields in the world—coal-fields as yet practically untouched—and a marvellous wealth of other minerals, cannot hope to enter upon the era of industrial prosperity which is undoubtedly before her, until she welcomes enterprise and capital and actively encourages the construction of the railways by which alone her enormous mineral wealth can be made accessible.

SOURCES OF MECHANICAL POWER

37. The first source of mechanical power was no doubt animal energy. Probably Man himself first of all turned the handle that drove the primitive machine, afterwards harnessing oxen or horses to the spokes of a rimless wheel or capstan, the circular motion of which was communicated to the machine by cogs or belting.

It is still possible, even in some parts of rural Britain, to see here and there at the present day a mill on a farm driven by "**horse-power**," the nominal power of a single horse being still almost universally used as the unit of measurement of mechanical power.

38. In later times, wherever natural motion existed, means were thought of for utilising it as a source of power and, in some cases, successfully adopted. Thus the energy of **falling water** was utilised by means of the familiar mill-wheel, and even where actual water-falls did not exist, the natural slope of the river-bed

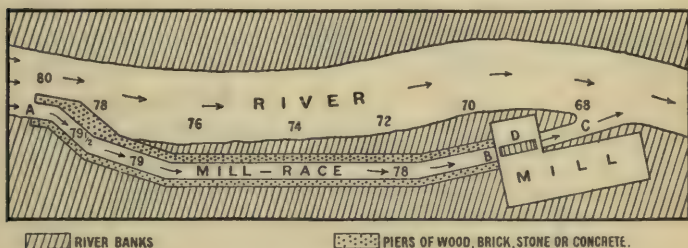


FIG. 9.—A MILL-RACE.

The figures represent imaginary heights above sea-level.

suggested the diversion of the water by an almost level and parallel artificial channel for a sufficient distance to obtain an artificial "fall," where the water was allowed to rejoin the original stream [Fig. 9]. The "mill-race" intercepts part of the river current at A, where the height of the water above sea-level may be 80 feet, to use a concrete illustration. The river itself, being more or less rapid, may be only 68 feet above sea-level at C; but the slope of the mill-race is much more gradual, and its level may only decrease from 80 to 78 feet between A and B, where it is allowed to fall freely a distance of 10 feet to rejoin the river at C,

driving the mill-wheel, D, as it does so. The only drawback to water-power is its liability to interruption—*e.g.*, through frost or drought.

39. In some lands where regular, strong winds prevail and are unobstructed in their course—as, *e.g.*, particularly in a flat country like Holland—**windmills** compensated to a large extent for the lack of water-power, as they do even at the present day for the lack of coal; but the most regular winds are subject to irregularity, so that wind-power, like water-power, is not always reliable.

40. But the discovery of steam-power and the invention of the **steam-engine** marked the beginning of a new era in industrial history. They revolutionised industry completely. Industry was no longer subject to the caprice of wind or weather, nor was it any longer restricted to river banks. While preferably, for economic reasons, factories would be erected on or near coal-fields, there was nothing to prevent their erection elsewhere, as the necessary coal could be transported. Factories became independent of locality (from the point of view of power) so far as profits would admit of the cost of transporting the coal. But the force of competition would prevent too great a cost from being incurred, and would thus tend to drive industry towards coal-fields and concentrate it upon them.

41. The **gas-engine**, driven by the force generated by the explosion of gas, is largely used in industry; but gas is in turn a product of coal, and the cost of laying gas-pipes enters into the problem. Thus, while gas as an illuminant is almost a necessity, and, as such, is willingly paid for at prices which admit of its being made from transported coal even at enormous distances

from coal-fields, as a source of power it must necessarily be cheap, and there will therefore be limits to the distances from coal-fields at which gas for power may be profitably manufactured. Moreover, the cost of piping will restrict the area of the industrial use of gas to within a reasonable distance of the gas-works. Many manufacturers now possess a gas-generating plant of their own, but as this again in most cases depends largely, if not entirely, upon transported coal,¹ the cost of transport generally decides the distance from the coal-field within which such a plant may be profitably used. In some localities vast subterranean stores of "**natural**" **gas** have provided a rich source of mechanical power, as in Pennsylvania and, more recently, in Alberta.

42. **Oil-engines** lighten the problem of cost, because oil-fuel costs but two-thirds as much as coal-fuel of similar efficiency, while its lighter weight, smaller bulk and greater ease of handling greatly reduce the cost of transport. Oil-fuel may thus render industry possible where distance from a coal-field prohibits the use of coal or gas; and, with improved engines of greater power, oil is likely to be increasingly used as a source of energy.

43. But **electricity** is probably destined to be the main motive power of the future. It is generated by a dynamo, which may be driven by practically any of the means already referred to, the current being either supplied direct to the motors which drive the machinery or stored in accumulators and thence conveyed to the motors as required. Electric power may be transmitted by cable to a greater distance from the generating station than gas at an equal cost, while the possibility

¹ Other substances are often used—*e.g.*, refuse of various kinds.

of storage admits of the accumulation of a reserve which may be used even when generation is temporarily suspended. These considerations have led once more to a large resort to water-power, whose energy is converted into electric current by what is known as a “hydro-electric” plant.¹ Thus Niagara has been largely “harnessed” by electric generating stations, whose current is carried twenty miles by cable to Buffalo, and there lights the city, propels the street tramways and drives the great flour-mills. As the available water-power of the world has at present, comparatively speaking, hardly been touched, electric energy opens up a possibility the full meaning of which it is difficult to estimate; and a country like Italy, possessing no coal but an enormous wealth of water-power which is still largely running to waste, is gradually harnessing it and developing into an industrial country of great importance. It is estimated that the cost of laying the cable for transmission of electric power for industrial use may be incurred for considerably over a hundred miles without becoming prohibitive.

44. Where, however, water-power is absent, and there happen to be, as in Ireland, enormous deposits of **peat**, it is more than probable that they will prove as powerful as coal in attracting industry. Peat, pressed and electrically dried, is said to possess greater heating power than coal, so that, should it prove possible to produce it in that form commercially—*i.e.*, in large quantities at a price sufficiently reasonable to admit of its use for industrial purposes—it might be applied to the production of steam and the generation of electricity. On the other hand it has been said that gas may be made direct from peat at a low cost as com-

¹ Driven by turbines.

pared with generation from coal; and, should it prove possible to do so commercially, the discovery would prove of the utmost value to Ireland.

45. The employment of the energy represented by the rise and fall of the **tides** has also been largely discussed, but nothing has as yet been done commercially towards using it, although an experimental plant (said to have proved unremunerative) was recently erected in Germany for the purpose. The use of tide-power would mean much to a country like Britain, whose shallow seas lead to exceptionally high tides, and whose coal-supply is gradually approaching exhaustion. The direct use of the **heat of the sun's rays** as a source of motive power may also prove to be commercially practicable; the most recent experiment is being made in Egypt, where there has been erected a specially constructed plant of which great things are expected in that land of constant sunshine.

COMMERCE

46. Industry is followed closely by Commerce, the proper sphere of which, strictly speaking, is the **transport and marketing of commodities**, or, briefly, their disposal after production. It is one thing to produce a commodity; quite another to dispose of it when produced. This was more especially true in the days before canals and railways came into existence, when road and river were the sole means of transport, and it took the best part of a week to convey goods from Manchester to London.

47. The produce of a particular factory is generally disposed of in one of two ways: either (*a*) it is consigned direct to branch offices or agencies in the towns where the demand exists or which are convenient dis-

tributing centres ; or (b) it is delivered to some form of local organisation which undertakes the task of forwarding and distribution. In both cases the factory is relieved of all trouble and responsibility in connection with the distribution, and it is indeed rare to find the factory in direct communication with the consumer.

48. This is only another instance of the working of the "division of labour" principle [27]. If each customer in a certain town, for example, were to communicate direct with the maker in another town, and have his own share of the product separately transported, the factory would have to face the expense of maintaining a large clerical staff to cope with the correspondence, accounting, packing and despatching, and the total cost to the customers of carriage of the separate parcels would much exceed their carriage if transported in bulk as a single consignment to a central distributing agency. Instead, therefore, of each customer attempting to attend to his own transporting, he leaves it to a **middleman or merchant**, who purchases the goods in large quantities from the factory, and pays a lower rate for the carriage of the goods in bulk, splitting them up, when received, and distributing them among the individual customers.

49. Customers find this not only cheaper but more convenient than dealing direct with the factory. It is clear, from their point of view—quite apart from the actual money economy in carriage—that they could never hope to be so expert in the work of collection, transport and distribution of the goods they require as a merchant who devotes his entire time and thought to that branch of commerce. From the factory point of view, also, the interposition of this merchant is a great convenience ; he saves the manufacturer a heavy

correspondence, and a great deal of trouble and expense. The merchant on his part is able to make quite a good living. The manufacturer willingly sells to him in large quantities at a considerably lower price than that at which he would sell smaller quantities to individual consumers, because it is worth his while to sacrifice a fair proportion of his selling price in order to escape the other and more expensive alternative. Thus the merchant is able to sell goods "retail" to the consumer at a price as low as would be charged by the manufacturer direct—in many cases actually lower—and at a less cost for carriage; while the difference between his buying and selling prices brings him in a revenue more than sufficient to cover the cost of working the agency.

50. Sometimes, and very commonly in the early days of a particular form of production, although the demand is believed to exist it does not take definite shape, and the goods are produced in the belief that they will be purchased when "placed on the market"—*i.e.*, offered for sale. In such a case they are "**consigned**" by the manufacturer to branch offices or agencies in the towns where the demand is believed to exist, and the agents—or merchants—have to "push" their sale—*i.e.*, try to find purchasers.

TRADE ROUTES AND CENTRES

51. Thus in place of a huge and awkward parcel transport we find a more simply handled traffic of goods in bulk, and their transportation will be made by the **most convenient route**. In an Intermediate course on Commercial Geography only the more important routes can be surveyed, but the reasons for their existence will be examined. Thus, for example, it will be shown how at various times in the world's

history, and for various reasons, the importance of the "Mediterranean" route has fluctuated.

52. The growth of "**trade centres**" is of equal interest and importance. Sometimes they are called into being by the existence of a considerable demand for commodities in a particular area, when they will be found to be situated at the most convenient point for the receipt of the goods in bulk and their distribution. Thus London owes its growth and importance as a trade centre largely to its situation at the head of navigation on the Thames, and near the centre of the English plain, which imparts great value to it as a receiving centre for imports from all parts of the world to be conveniently re-distributed throughout Britain and the continent of Europe.

53. Sometimes a trade centre will grow at the "factory end" of the trade route, where a large number of factories, spread over a large area, are all engaged in the same form or forms of production. Such a tendency is illustrated by Manchester, which, although in existence as a town long before the introduction of the cotton industry, owes its rapid subsequent growth and present importance almost entirely to the cotton area amid which it lies. Not only does it act as a receiving centre for raw material imported, but it performs the function of a collecting and forwarding centre for the bulk of the cotton manufactures produced by Lancashire and Cheshire mills.

TOWN GROWTH

54. While many towns owe their growth in this way to their convenience as trade centres, others result from various influences arising out of transit trade. Where free communication between two districts is interrupted

by a range of mountains, all transportation between them will follow the most convenient mountain pass ; and where the road through the pass descends to the plain it will branch out in all directions over the plain. At this spot goods which have come through the pass in bulk require to be split up, and the portion intended for each locality sent on by its particular road. Where this splitting-up occurs a town will almost certainly grow, and Manchester, referred to in the preceding paragraph, originally grew in such a situation, at the meeting-place of plain and hill, where roads across the plain converge and hill roads descend. Similarly a town will grow on a river bank where roads converge upon a ford, a tendency traceable in the names of certain English towns—*e.g.*, Oxford.

55. Wherever the bulk of goods must be broken up, in fact—as **where roads, rivers, or railways meet**, or **where a change in the mode of transport is necessary**, as at the head of navigation of a river where goods are transhipped from sea-going steamer to river steamer or train, or *vice versa*—towns will grow. Perhaps the commonest instance of this is afforded by a seaport town, where sea-going ships unload and goods are taken on to their ultimate destination by road, canal or rail.

TRANSPORT

56. In some countries—as, *e.g.*, in China—**human carriers** are still the usual method employed, and it is the most expensive as well as the least satisfactory, as men cannot be so thoroughly controlled as animals or machines and have to be paid as well as fed. **Beasts of burden** exist in most parts of the world, from the mule that carefully foots the mountain track to the camel that crosses the desert. In countries where

regular roads exist the **cart** is always to be found in some shape or form; and the **waggon**, a long, four-wheeled cart, is largely used for bulky transport—as, e.g., wheat in Canada. The **traction engine** is sometimes used to draw a train of waggons, but not to such an extent as its apparent usefulness would seem to warrant. The development of the **motor-vehicle** is significant, and will no doubt promote road transport where railways or other means do not exist, or where railway rates are excessive. The motor may ultimately have an effect even upon railway transport, if only as an influence in reducing or restraining railway rates (*cf.* canals, § 58).

57. In **river navigation** the steamer is the most important means employed, as securing independence of the flow of the stream. Sailing vessels are sometimes used, especially where, as on the Nile, the wind may be depended upon to blow up-stream for several consecutive months. The most economical use of rivers is seen in cases where the bulk of the transport is down-stream—as, e.g., timber or coal for market or export. In such cases, if the flow of the stream be not too slow, little, if any, motive power is required. Thus, for example, on the Ohio one stern-wheel steamer will push down-stream a huge raft of barges containing 60,000 tons of coal.

58. **Canal transport** was of more importance in pre-railway times than it is at the present day. Many canal systems, like that of Britain, or the Erie Canal and others in the United States, have fallen into comparative disuse, chiefly through railway competition.¹ Railway rates were fixed at or reduced to the point at which

¹ In a few cases, to avoid competition, railway companies purchased canals outright and deliberately allowed them to fall into decay; but the best canals in England now are railway-owned.

merchants found it more economical, all things considered, to use the railways; but the existence of the canals remains as an effective check against any tendency to unduly raise railway rates (*cf.* motors, § 56). It should be remembered that, as compared with railways, canal transport is necessarily slow, not only on account of the rate of travel but also owing to the limited capacity of the vessels or barges and the delays incidental to the use of locks; yet extended and improved canal service with lower rates would undoubtedly foster traffic in certain classes of commodities. In eastern Europe, where the railway system is as yet incomplete, the canal system is of great importance; and in France, in spite of railway competition, the excellent canal system is still largely used for both light and heavy traffic. **Ship canals** such as the Suez, the "Soo" and the new Panama are, of course, of the utmost importance to the commerce of the world.

59. **Steam** is the chief motive power in rail and sea transport, but many railways are being "electrified," and oil-fuel has been successfully used at sea in place of coal, and even, in some countries, on the railways. **Electrification of railways** is likely to be increasingly resorted to—particularly on short-distance and local lines—as being economical and simple in working as compared with steam. **Oil-fuel on board ship** is a great saver of space, occupying only one-fourth of the bunker accommodation required for an equal "power-value" of coal, while its actual cost as fuel is only about two-thirds that of coal. It possesses great strategic value, enabling a vessel to undertake a much longer journey than is possible to a coal-using steamer without renewing her stock of fuel. Large vessels equipped with engines for the consumption of

oil have recently been launched, and it is certain that this form of marine propulsion will be increasingly adopted.

CAUTION

In an old country like Britain, where industry takes an infinite variety of forms, internal trade is usually very much greater in volume than foreign trade, while in a new country like Argentina the latter may equal or even exceed the former. Great care, therefore, should be employed in using statistics of foreign trade as a means of estimating the growth or decline of the *entire* trade of a country.

QUESTIONS

1. In Britain a "southern exposure" is desirable for fruit-trees, etc. Why? Would a southern exposure in New Zealand be equally desirable?

2. Why does London experience greater extremes of temperature than Liverpool?

3. Why, in the brightest sunshine, may lofty mountains preserve their snowy caps?

4. Have you ever noticed the alternation of land-and-sea breezes at the seaside? If so, describe and explain what you observed.

5. Consider some industry in a locality with which you are acquainted and endeavour to assign geographical causes for its existence.

6. If tropical conditions exclude "white" labour [§ 35], how is it that we find white men residing in and controlling a land like India?

7. Steamers of over 50,000 tons burthen now cross the ocean. Is the size of ships likely to transport to a out limit?

8. In a small town one generally finds shop goods less varied and prices higher than in a large city. Why?

9. One can purchase in a shop for a penny a toy which no carpenter, however skilled, could make to order for less than a shilling. Why is this?

10. What advantage to industry does a hydro-electric plant show over the direct employment of the energy of water-power by a mill-wheel?

11. Endeavour to give geographical reasons for the existence of the town in which you live.

12. Why are canal transport rates lower, as a rule, than railway rates?

produce on the

CHAPTER II

CERTAIN PRODUCTS

60. **Wheat** is the most important food product, being the chief food-stuff used in western Europe and "temperate" America. It is thus grown wherever conditions permit, should no other crop offer greater inducements. Wheat requires sufficient moisture—but not too much—during the period of growth; dry warmth for ripening; and a fairly stiff soil to support the stalk and retain the necessary moisture about the root. The slimness of the stalk for the weight of the grain renders it peculiarly liable to injury by moist winds; and, where these occur, the crop will necessarily be speculative.

61. While the grain is a natural product of temperate lands, it may be grown in the tropics either (*a*) where the winter is sufficiently cool to admit of its growth in that season, as in northern India, or (*b*) where the elevation counteracts the excessive heat, as on the plateau of Ecuador.

62. It forms an ideal crop for **new countries** where conditions otherwise are suitable, as land is cheap; and where, as in the United States, perfection of organisation has brought cheap and good agricultural machinery within the reach of practically every farmer, and reduced the cost of handling and transport to a minimum, the extent of production is enormous.

63. The **United States**, until quite recently, headed the list of wheat-growers; but in 1909 she was overtaken by the **Russian Empire**, where new wheat-lands are being rapidly settled on the Steppes and in Siberia. The area under cultivation in the United States is also increasing with the development of irrigation and "dry-farming" [24], yet the wheat-crop tends to decrease in favour of maize for the great stock-fattening industries [70].

64. Crops vary so greatly from year to year that it is difficult to make a reliable comparison, but averages for the years 1909 to 1913 inclusive show that, while the United States' production is still

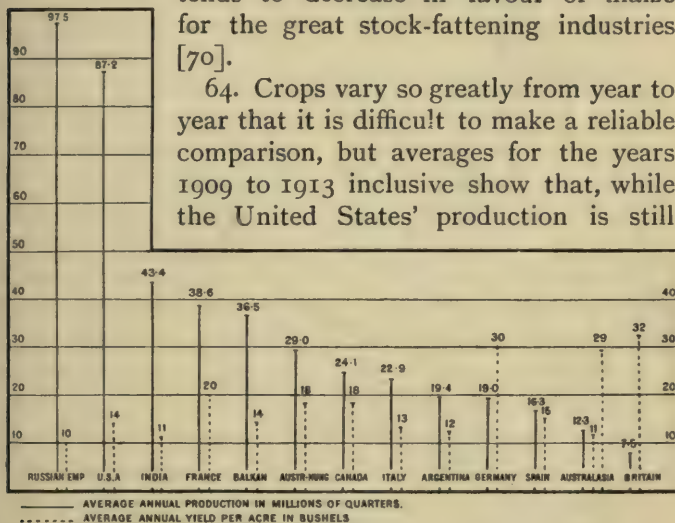


FIG. 10.—WHEAT PRODUCTION AND YIELD.

Averages for 1909 to 1913 inclusive.

double that of India, the Russian Empire now distinctly leads [Fig. 10].

65. The return of wheat from the land varies greatly in different countries and under different conditions. It is thus possible to find that an acre in Denmark may produce on the average 42 bushels of wheat, while an acre in some parts of Russia may produce no more

than 8. The degree of productivity may be a matter of climate, as, *e.g.*, in India or Australia, where droughts occasionally play havoc with crops; but it is more commonly a question of fertility or cultivation. In a new country, where land is so cheap that the holder of an exhausted tract finds it less profitable to manure it than to leave it for a new tract, it is natural to find a rate of production per acre lower than that of an old country where all the land is in use and loss of fertility

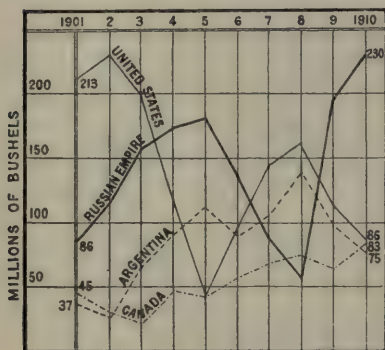


FIG. 11.—WHEAT: FLUCTUATION OF EXPORTS.

demands manuring—so far as profits will admit. We thus find [Fig. 10] that the yield per acre is low in lands like Russia, Australia and Argentina, where there is still much room for expansion, while it is much higher in old countries like France, Germany and the United Kingdom.

The yield of 29 bushels per acre in the case of New Zealand (shown in the figure by a separate dotted line beside the Australian lines) is high for a new country, and is a direct testimony to the altogether exceptional fertility of the soil, as is also the Canadian yield to a more moderate degree; while for an old country like India the low yield of 11 bushels is due to primitive methods still in vogue there.

66. But the important consideration for wheat-consuming lands, like the United Kingdom, which cannot grow enough for their own requirements, is not

where the largest crops are grown, but where there is the largest available **surplus for export** ; and countries which export much wheat are few. The United States, until quite recently the leading exporter, is now excelled by the Russian Empire [Fig. 11]. The remarkable fall in the export of the former is confidently expected to continue, as the limit of wheat-production is clearly in sight while the wheat-eating population continues to increase rapidly.¹ The equally notable rise in the Russian export will also continue because of (a) the rapid development of new areas² already mentioned [63] and (b) the fact that the population uses rye mainly—not wheat—as a bread-stuff.

67. Argentina, like Russia, possesses enormous tracts of new land, but her population is comparatively small and she has to depend upon immigration for its development. Canada is in a somewhat similar position, although her average export is hardly yet equal to that of Argentina. The export of the Balkan States has recently risen considerably, possibly owing to improvements in cultivation. Next follow Australasia and India, the export in both cases fluctuating widely with the rainfall. In the case of the former it has varied from 230,000 quarters in 1903 to over 8,000,000 in 1911; while India's export has varied from 11,600 quarters in 1901 to over 10,000,000 in 1905, the figure for 1912 being nearly 6,500,000. The dry Canadian climate produces a particularly hard grain, rich in gluten. Such wheat is valued for mixing with the more starchy grain of moister climates, *e.g.* Europe, to ensure a mellow flour. By far the largest importer of wheat is Britain [Fig. 12].

¹ Aided by the large immigration.

² Without the aid of immigration [359].

68. Maize¹ has peculiarly fattening properties, and is chiefly used as an animal food,² although it is also largely employed in distilleries and in the manufacture of "corn" flour, starch and glucose. The grain thrives best in a hot, sunny climate, and requires regular moisture. An exceptionally dry summer favouring wheat [60] would prove fatal to maize in the absence of irrigation; but maize, on the other hand, will thrive in a temperature too high for wheat.

69. Maize is a prolific crop, yielding about twice as much grain to the acre as wheat; but as its value per bushel is much below that of wheat, while the cost of transport is the same, it is generally found less profitable in the United States to export the grain than the meats in the production of which it is used. Thus,

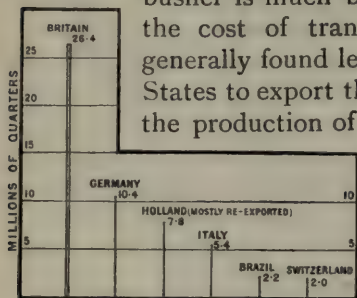


FIG. 12.—WHEAT: CHIEF IMPORTERS.

Averages for 1906 to 1910 inclusive (reckoning 1 bushel=60 lbs. grain =45 lbs. flour).

although quite three-fourths of the world's maize-crop is grown in that country, comparatively little is exported³—mainly to Canada and western Europe.

70. Many regions are equally suitable in

climate for both wheat and maize, which then enter into competition; and the higher profits of meat-production at present prices tend in the United States to increase the maize crop at the expense of wheat.

71. Maize is largely grown in north Italy and central and eastern Europe, particularly in Rumania where

¹ Known in America as "Indian Corn," or, more briefly, "Corn," and in South Africa as "Mealies."

² It is much used as a human food in many producing countries.

³ About one bushel in every eighty produced.

the rearing of swine is a speciality; and it forms an important crop in Queensland and New South Wales. In the greater heat of the former it is the chief grain crop, while in cooler New South Wales it follows wheat. It is also rapidly becoming important in South Africa, whose export has risen remarkably in recent years [508].

72. **Oats** are more easily grown than wheat, and will thrive in a greater variety of soils and climates; but a full-weight crop requires a moister and cooler summer. It is the chief grain crop in the United Kingdom (particularly in Scotland and Ireland), Scandinavia, Denmark, Canada and New Zealand, and the second grain crop in Germany and the United States. Although mainly used as a food for horses, the grain is in considerable use as a human food in oat-growing lands, and this use is extending with the manufacture of prepared foods.

73. While **barley** thrives best under ideal "wheat" conditions [60], there are varieties which may be grown successfully in higher latitudes and altitudes than any other cereal. It is thus found growing side by side with oats in lands which are too cool for wheat, as in much of Norway, and side by side with wheat in lands which are too dry for maize, as in most countries bordering upon the Mediterranean. Its adaptability to such a wide range of conditions makes it a most important grain crop. It is largely used as a bread-stuff in Scandinavia, as it was formerly in Scotland, and as a horse-food; but it is mainly grown for making beer, as in England and Germany, where as much barley as wheat is grown, or whiskey, as in Scotland and Ireland.

74. **Rye** is little known in the United Kingdom, where only one acre in a hundred of the grain-growing land is devoted to it; but on the continent of Europe it ranks equally with wheat in its use as a bread-stuff. As a grain it is cheaper than wheat, and as a crop it

seems to grow best in poor soil and in bleak climates where no other grain-crop prospers. It thus naturally became the staple product of exposed areas like northern Germany and central Russia.

75. The varieties of **rice** yielding the bulk of the world's crop require hot summers and fields that may be flooded with water at will; but there are also kinds—known as “upland” or “hill” rice—which thrive without the flooding. The former are a natural product of lands in south-eastern Asia drenched by the summer monsoons [15], where the great heat often produces two crops in the same season from the same land.

76. Rice yields more food per acre than any other grain, and is the staple food of probably quite one-third of the human race; but its use in Europe and temperate America is comparatively limited, so that it is not of great commercial importance. It is grown in low-lying parts of southern Europe—particularly in Italy—and its steadily-extending cultivation in the swampy districts of the southern coastal plain of the United States already supplies half of that country's requirements. The chief supply for European consumption comes from India (mostly Burmese), Japan and Italy following.

77. **Sugar** is derived commercially from two main sources—sugar-cane and sugar-beet. The former is a tropical product, requiring not only abundant heat but an exceedingly moist soil; most rice-fields, therefore, are admirably adapted for sugar-cane, and are even in some parts being turned into sugar plantations. The hot, wet lowlands of south-eastern Asia and India grow enormous quantities of cane, the sugar from which is mainly consumed at home; the cane commercially available is supplied chiefly by Cuba, Java and Hawaii [Fig. 13]. Considerable quantities are

grown in the hot, swampy districts of the Mississippi plain and delta, and on the hot coastal plains of Queensland and Natal.

78. The **sugar-beet**, on the other hand, will thrive in comparatively poor soil and requires a temperate climate; it forms a profitable crop in central and eastern Europe, where **Germany** is the largest producer, and in many parts grain-lands are being converted into beet-fields. Experimental crops are being raised in England and elsewhere with a view to its cultivation where grain-growing is insufficiently remunerative.

79. Formerly almost entirely the product of the cane, sugar is now, apart from the Asiatic production for home use, chiefly derived from beet. The change has entailed a revolution—however gradual—in sugar manufacture, having largely transported the industry from the tropics where the cane is grown to temperate lands which grow the beet and are the chief sugar-consumers. Thus beet-sugar is now mainly manufactured in central Europe, Germany leading, and in the United States.

80. The juice is obtained from the cane by crushing it between heavy rollers, from the beet by soaking it, when sliced, in hot water; and the sugar is then obtained by evaporation and crystallisation. The syrupy residue is known as molasses, and the yellow crystallised sugar finally undergoes a process of refinement.

81. The chief considerations in favour of **cane** are (a) the slight attention required by the crop, (b) its superior richness in sugar, and (c) the cheapness of tropical labour. The cane is cut down for crushing, and the perennial roots furnish crops year after year for quite a generation with a minimum of attention. It is estimated that the yield of sugar juice per acre from

cane is twice that from beet. **Beet** has in its favour that it can be grown (a) where sugar is most heavily consumed, and (b) where capital for the best machinery is abundantly available; and (c) that the refuse after extraction of the sugar forms a valuable cattle-food, that of the cane being fit only for fuel.

82. The fact that beet is gradually supplanting cane is proof that the conditions of production more than compensate for (a) the extra cultivation necessary in sowing a fresh crop annually and liberally manuring the land, (b) the inferior yield of sugar, and (c) the relatively dear labour employed.

83. In the early days of the beet industry it was protected against "cane" competition in most European countries by State "bounties," or payments made

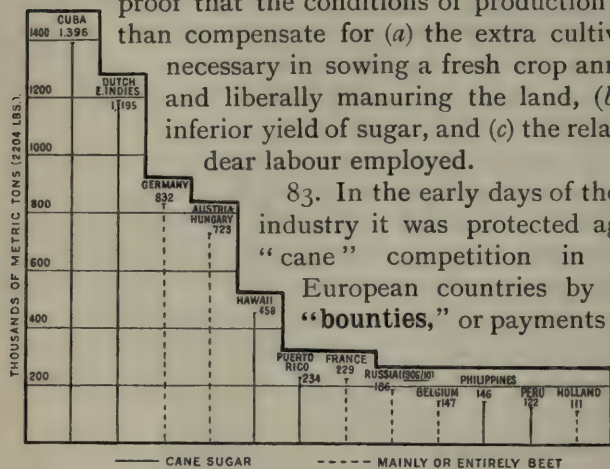


FIG. 13. — SUGAR : CHIEF EXPORTERS.

Averages for 1907 to 1911 inclusive.

to producers to relieve the cost of production. Such bounties are commonly paid at a fixed rate to all exporters to enable them to compete successfully in other lands with manufacturers producing more cheaply elsewhere, the industry meantime being protected at home by an import tax [31]. These sugar bounties have now, however, been abolished by general agreement.

84. In eastern Canada and also, to a small extent, in the north-eastern United States, the trunk of the

sugar-maple is tapped and yields sugar-juice; and there are various sugar-yielding palms also in tropical lands. Millet and maize as possible sources of sugar have for some time been experimented with in the United States, the former, it is said, successfully. The leading exporters and importers are shown in Figures 13 and 14.

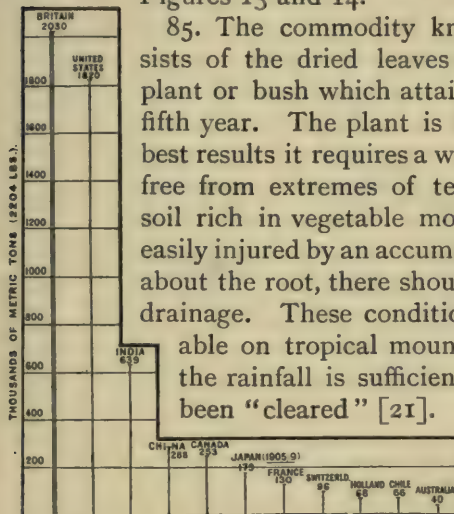


FIG. 14. — SUGAR : CHIEF IMPORTERS.

Averages for 1907 to 1911 inclusive.

85. The commodity known as tea consists of the dried leaves of a sub-tropical plant or bush which attains maturity in its fifth year. The plant is hardy, but for the best results it requires a warm, moist climate free from extremes of temperature, and a soil rich in vegetable mould; and, as it is easily injured by an accumulation of moisture about the root, there should be good natural drainage. These conditions are all obtainable on tropical mountain slopes, where the rainfall is sufficient and forests have been "cleared" [21].

86. The leaves are picked several times during the year, and require a considerable

amount of careful hand labour during the processes of drying and fermentation. (In the preparation of "green tea" fermentation is not allowed to take place.) Countries likely to be most successful in production, therefore, will be those with suitable conditions of climate and soil and sufficient good, cheap labour, *e.g.*, China, Japan, India and Ceylon.

87. Twenty-five years ago China furnished about

three-fourths of the world's supply; but now, owing to an enormously increased production in India and Ceylon, more particularly in the latter, she accounts for little more than one-fourth [Fig. 15]. Britain is the largest importer.

88. The **coffee** berry is the fruit of a tropical shrub or tree which takes six years to reach maturity and bears fruit for thirty years or more. The best conditions of climate and soil are similar to those favouring tea [85], but the tree, although able to stand an occasional frost, is not so hardy as the tea-plant, and its cultivation is therefore

practically restricted to the tropics. It suffers, also, from too great ex-

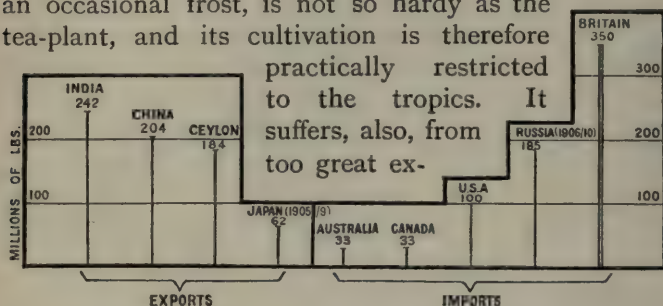


FIG. 15.—TEA: CHIEF EXPORTERS AND IMPORTERS.

Averages for 1907 to 1911 inclusive.

posure to the direct heat of the sun's rays, and is therefore generally grown in the shade of some other tree such as the banana or the rubber tree, either of which provides an additional source of profit. On the slopes of the **Brazilian highlands**, where three-fourths of the world's available supply is produced, the desirable shade is often obtained by growing a tall plant of the "pea" family, the annual decay of which helps to enrich the soil.

89. The best "coffee" conditions are found on the

higher Red Sea slopes of the **Arabian plateau** (Yemen) whose plantations are screened daily from the excessive heat of the Arabian sun by mists rising with almost unfailing regularity from the coast, and protected at night against the cold, natural at a high level, by warm air rising from the sea.

90. Embedded in the pulp of the coffee berry are found the seeds or "beans" which form the coffee of commerce. After extraction from the pulp they are dried and sun-cured. During these processes they are easily injured by moisture, and in a country like Brazil the unreliability of the available labour makes it difficult to ensure their safety from injury in this way; the beans are therefore dried in their pulpy covering, which is afterwards removed. Coffee so produced is inferior in flavour to that which is "pulped" before being dried; consequently efforts to improve the Brazilian cultivation are directed mainly towards the substitution of machinery for manual labour in the "pulping" process.

91. **Liberia** produces a variety which will grow well without shelter, and which can, it is said, withstand the diseases and insect ravages which have practically destroyed the plantations of Ceylon and led to the substitution of tea for coffee as the main crop.

92. Arabia exports comparatively little coffee, and the chief source of supply, apart from Brazil, is **Java**. Central American exports are increasing, and coffee-growing in India is extending. Cultivation in Liberia, though sadly neglected, might easily be made most profitable. Coffee is also grown, although with indifferent success, on the tropical slopes of northern Queensland, where conditions appear to be in every way

favourable; and it is rapidly increasing in importance in most parts of tropical Africa, particularly in British territory.

93. The commodity known as **cocoa** is really obtained from the seeds or "beans" found in the fruit of the **cacao** tree, a tropical product which attains maturity in twelve years, and, like the coffee tree, continues to bear for thirty years or more. Though preferring a higher temperature than the coffee tree, it is even more liable to injury from direct exposure to the tropical sun, and therefore requires a "shade" tree. It also demands

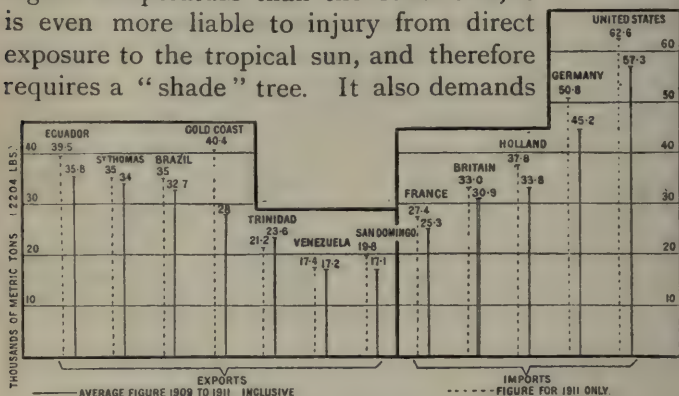


FIG. 16.—CACAO: CHIEF EXPORTERS AND IMPORTERS.

more moisture and a deeper soil, and is therefore more commonly grown in tropical lowlands.

94. The moist heat of the coastal plains and valleys of **Ecuador**, **Brazil**, **St. Thomas** and the **Gold Coast** enables those lands to compete strenuously for the first place in production [Fig. 16]. In all four, as shown by dotted lines in the figure, cultivation is steadily extending; but the phenomenal rapidity of increase in the Gold Coast [Fig. 17] enabled it to become in 1911 distinctly the chief producer with an excellent prospect of retaining the position. The increase in southern

Nigeria is but a repetition of the earlier stages of the Gold Coast development.

95. The great general increase in production in the absence of a corresponding increase of demand would almost inevitably result in a fall in price, which would tend to check further extensions; but the world's consumption is also steadily increasing, as shown by the dotted import lines in Fig. 16 and the estimate in Fig. 18; and so long as it continues to rise, further proportional increases in production under present conditions will be profitable.

96. The cacao seeds, or "beans," after removal from the fruit, are fermented and sun-dried like coffee; and the degree of care exercised in their preparation has a great effect upon the market value. The extraction of the natural fat, forming about half the substance of the bean, has become quite an industry, particularly in Germany, the resulting "cacao-butter" deriving special value from its "keeping" property. The cacao is greatly improved by the extraction of this indigestible fat, as none of the valuable nutritive qualities are lost in the process.

97. The raw cotton of commerce consists of the woolly tufts of fibre contained in the seed-pods of a

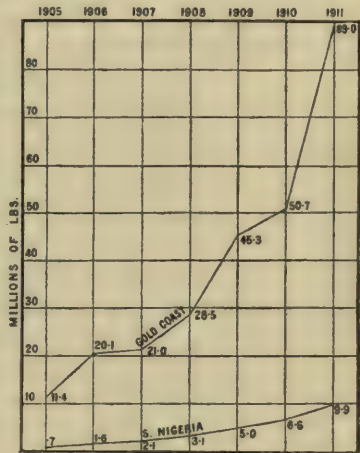


FIG. 17.—CACAO: INCREASE OF COLONIAL EXPORTS.

subtropical plant, the perfect culture of which requires (a) safety from frost, (b) moderate and regular heat, (c) bright sunshine, (d) a good but not excessive rainfall, (e) a soil in which lime is present, and (f) salinity of soil and air. Needless to say, this is a combination of conditions rarely experienced, so that the best cotton is limited in quantity and readily commands a high price.

98. The **United States** has for long been far

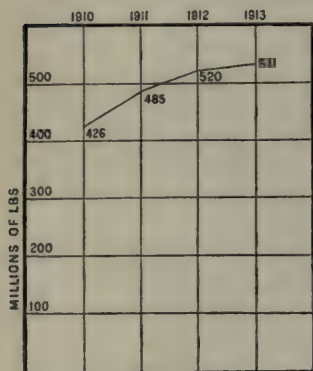


FIG. 18.—CACAO : WORLD'S CONSUMPTION (ESTIMATED).

the largest producer, and, although her export shows a tendency to decrease, she still furnishes over two-thirds of the world's available supply [Fig. 19].

99. There are two main varieties of American cotton, known as "Sea Island" and "Upland" respectively. The former yields a much longer, finer and silkier fibre, or "staple," than the latter, and will not grow to perfection away from the sea. It

derives its name from the original source of supply—the low, sandy islands fringing the coasts of the Atlantic states of South Carolina and Georgia. It is still grown there, and along the shores of the two states named and in part of Florida.

100. The "Upland" variety, furnishing the bulk of the American output, is an inland product, and an area about half that of Britain is devoted to its cultivation. The most productive areas are the Mississippi "bottoms"—low-lying lands in the Mississippi valley subject to

periodical inundation; the "black belt" of Alabama; and the "black prairie land" of Texas—all three being extremely fertile and exceptionally rich in lime.

101. The "Sea Island" variety has been introduced into Egypt and elsewhere. In **Egypt** it has been particularly successful; most of the necessary conditions of soil and climate are found there, and the absence of rainfall is atoned for by irrigation, while the evils to which irrigation is apt to give rise, through stagnation of moisture in the tissues of the plant, are largely avoided by the rapid "transpiration" promoted by the extreme dry warmth of the air.

102. **Indian** cotton is mainly of the "Upland" variety, but the fibre is distinctly inferior to American. This is due partly to natural conditions and partly to lack of care in the cultivation and preparation, which is now, however, gradually being made good.

The area devoted to cotton in India is about one-fourth that of Great Britain, mainly on the Deccan behind the shelter of the Western Ghats, where the often too slight

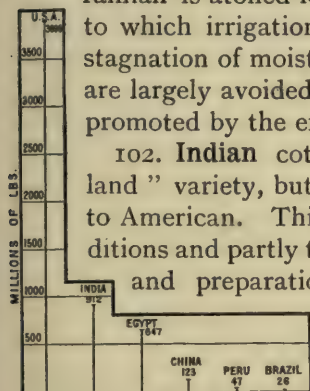


FIG. 19.—RAW COTTON:
CHIEF EXPORTERS.

Averages for 1909 to 1911
inclusive.

rainfall is compensated for by the tenacious "black cotton soil." This soil is very fertile, consisting of decomposed basaltic rock—*i.e.*, of volcanic origin [21], and has a wonderful capacity for retaining moisture even when baked and cracked on the surface by the heat, irrigation being thus unnecessary. A considerable quantity is also grown in the United Provinces, the Punjab and Sind, in all of which the scanty rainfall and the absence of "cotton soil" necessitate irrigation—the dry heat, as in Egypt, counteracting its evils.

103. Exports may and do fluctuate largely; but even allowing for heavy fluctuations the commanding position of the three chief cotton-exporting countries is sufficiently evident from Fig. 19. **Britain is the largest importer** [Fig. 20].

104. The average yield of cotton per acre varies greatly in different lands. In India it is below 100 pounds, in America about 200, and in Egypt 500. The crop responds generously to manuring, and the use of fertilisers has been gradually spreading in the United States during the last fifty years; but in India manure is, as yet, comparatively little used, and the high yield in Egypt does not give the same in-

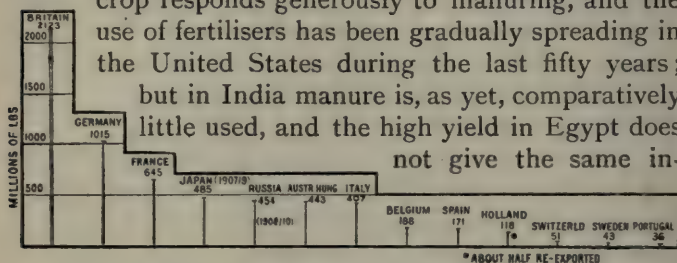


FIG. 20. — RAW COTTON : CHIEF IMPORTERS.

Averages for 1909 to 1911 inclusive.

ducement to incur the expense, although it is said that even there the yield might be increased by 200 pounds per acre.

105. The fibre contained in the pods or "bolls" of the plant, which open when ripe and display their contents, is usually picked by hand; but even this is now done increasingly by machinery. When picked, it still contains seeds, from which it has to be freed by "ginning" machinery; and it is then pressed and packed in bales for export.

106. The seeds are also of special value, yielding oil when pressed. The residue is made into "cotton-cake," which is a valuable cattle-food and fertiliser by virtue of the fact that, while the cotton-plant's demands

upon the soil are heavy, the fibre and the oil together contain but a fraction of the plant-food absorbed, the crushed cotton-seed containing almost the whole.

107. Owing to the predominance of the American supply [Fig. 19] all great manufacturing countries are more or less dependent upon it; and any shortage in the crop or manipulation of the price seriously affects their industries, as the total available supply is seldom sufficient to meet the world's manufacturing demands. In such countries we find a "Cotton-Growing Association"—an organisation formed to promote the growing of cotton in other parts of the world and usually assisted by a Government grant of money.

108. The **British Cotton-Growing Association** natur-

ally confines its labours to promising parts of the British Empire, and it has been rewarded by a rapid growth of cotton production in Uganda, Nigeria and Nyasaland [Fig. 21], the unfortunate set-back in the Nigerian output for 1910 and 1911 being merely temporary. The rich soil and warmth of the Sudan are likely to produce an important development there; while it is claimed that, with care and scientific culture, the cotton-crop of India might be doubled within a few years.

109. The importance of the cotton industry is due not only to the variety of materials into which the fibre

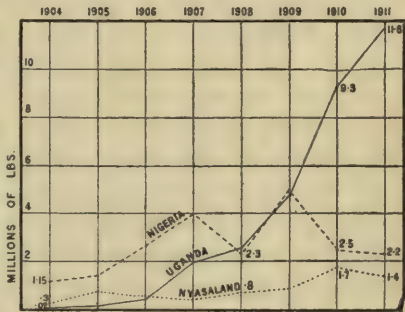


FIG. 21.—RAW COTTON: INCREASE OF COLONIAL EXPORTS.

may be made but to the world-wide demand resulting from their usefulness and cheapness. Not only do they include cotton threads and calico of various qualities, but sateens and even so-called linens, satins, silks and velvets.

110. **Flax** will thrive in a variety of climates, but, for the best results, should have a fairly stiff, moist soil. The plant yields two products—the fibre, from which linen is manufactured, and the seed, which yields oil. Both products cannot be obtained to perfection from the same crop; if the fibre is fine, as in Russia, the seed will be second-rate; if the seed is good, as in India, the fibre will be inferior.

111. The flat, moist soils of Russia, Belgium, Holland and Ireland are peculiarly suitable for flax-growing, and yield excellent fibre; but, while the Russian crop is enormous, those of the low countries are comparatively small and that of Ireland but a fraction of its former volume. The decline in the Irish cultivation is due to the fact that it is impossible for the farmer in Britain to sell his crop as it is pulled (or “in the straw”) as on the continent; British buyers will take it only if “retted,”¹ a laborious and disagreeable process which the Irish farmer, as a rule, has neither inclination nor labour to undertake. Notwithstanding this difficulty the Irish flax area has lately been increasing, and as British imports alone represent the produce of an area at least ten times that at present devoted to it, there is ample room for an important development, and cultivation is now being systematically encouraged.

¹ The process which frees the fibres from the vegetable matter or the stem. Attempts are being made in the United States to accomplish this by machinery.

112. The largest flax-growers are India, Russia, Argentina and the United States [Fig. 22]. Russian flax, as has been said [110], produces a fine fibre and a seed which is not rich in oil; yet she obtains enormous quantities of seed, which furnish a useful animal and peasant food-stuff and a valuable export. The crops of India, Argentina and the United States yield rich seed and poor fibre. Flax is also largely grown in central Europe and northern Italy.

113. Although wool is obtained from many different animals, the commercial supply is mainly derived from the fleece of the domestic sheep. The sheep, of course, also supplies us with mutton, but animals reared for their mutton do not yield the best wool, and *vice versa*.

114. In most sheep-rearing countries wool is the product specially desired, and the importance and extent of the industry make sheep the most numerous of domestic animals. The short, fine grazing of lime-

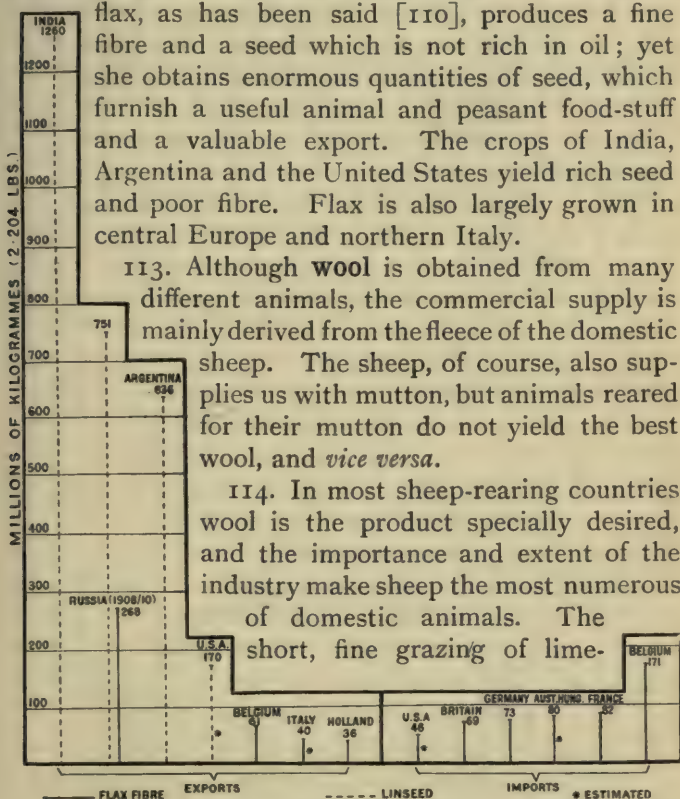


FIG. 22.—FLAX: CHIEF FIBRE EXPORTERS AND IMPORTERS AND LEADING SEED EXPORTERS.

Averages for 1909 to 1911 inclusive.

stone country and a fairly dry climate free from extremes of temperature give the best results, Australia being almost ideally suitable but for occasional disastrous droughts.

115. On the grassy Mediterranean hill slopes, where the climate is specially favourable, the merino sheep, which yields the finest of fibre, found its original home. Spanish wool was formerly the finest obtainable, but the carelessness which has characterised the Spaniard in all directions, for the best part of two centuries, practically ruined his industry.

116. Britain is one of the great producers, and wool is still her chief agricultural export, notwithstanding that most of the home product is used in the great woollen industries of the country which demand also an enormous import of foreign and colonial fibre. The best English wool, raised in Leicester, Nottingham, Lincoln and York, has a long staple or fibre, and is one of the finest wools produced.

117. The largest producer is **Australia** [Fig. 23], where the merino sheep was introduced and

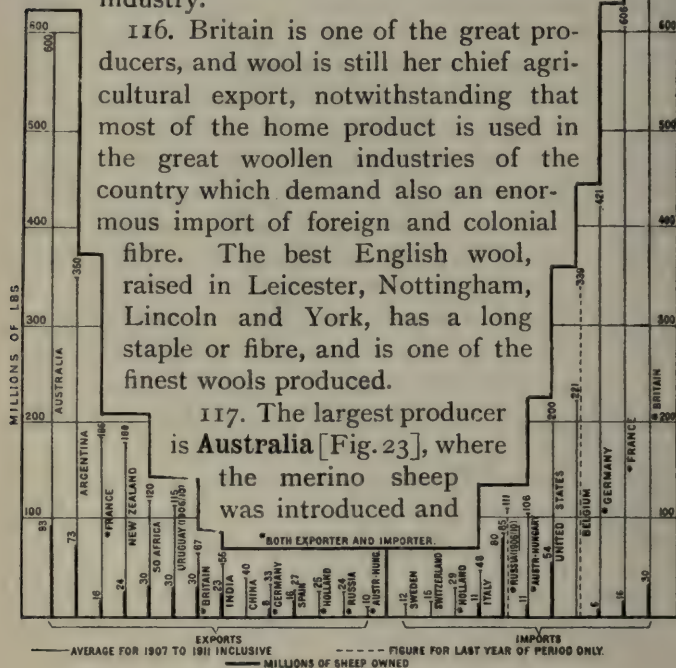


FIG. 23.—RAW WOOL: CHIEF EXPORTERS AND IMPORTERS.

yields, in the warm, dry climate, the finest and most lustrous long-stapled wool obtainable. This is a notable instance of the effect of climate upon production, as the

fibre of the original merino sheep, though very fine, is quite short. In its natural state wool is coated with grease, which prevents the fleece from "matting" or "felting" hopelessly; and for a similar reason, although the grease has to be removed by washing or scouring before the fibre can be manufactured, most wool is exported "greasy," afterwards yielding on an average only about half its weight of clean wool. The fact that a proportion of the exports is "clean"¹ renders caution necessary in drawing deductions from the Figure.

118. The demand for mutton consequent upon the invention of cold storage has been met in Australia by crossing the merino sheep with the best English breeds, with the result that fine wool and good mutton are now both obtained, although neither is naturally as good as the best of its class.

119. **Argentine** wool, owing to troublesome "burrs" in the pastures and lack of care in the handling, formerly brought a low price and required special machinery for its manufacture; but it is now much improved and, as it is naturally excellent, production is rapidly growing. **New Zealand** ranks with Australia in the quality of her product; the **South African** fibre is neither so long nor so fine. **Uruguayan** wool is similar to that of Argentina.

120. In gauging the relative importance in different countries of wool-production as an industry, it is useful to know the number of sheep owned; and this information is also given approximately in Fig. 23. It is worthy of note that Russia owns more sheep than Argentina, while her import of wool largely exceeds her export and is rapidly increasing—a distinct testimony to the importance of her woollen industries.

¹ The proportion is really inconsiderable in most cases.

121. **Britain imports** for consumption in her woollen factories more than three times the quantity of wool produced at home, this vast supply coming chiefly from Australia, New Zealand and South Africa. The market for the River Plate product is mainly on the continent, where the special machinery required for its treatment [119] was originally erected. The United States produces enormous quantities of inferior wool, which is practically all consumed by rapidly-growing home industries—along with a large import of foreign fibre.

122. **Silk** is derived from the so-called “silk-worm” —really a kind of moth in the caterpillar stage. When about to enter the chrysalis stage the “worm” surrounds itself with a protecting “cocoon,” consisting of a very fine, bright, strong fibre coiled round itself an infinite number of times. So fine is it that in the spinning of silk for the market the fibres of five to twenty or more cocoons—according to the degree of fineness desired—are reeled off together to form a single thread.

123. The food of the cultivated silk-worm is the leaf of the mulberry, and silk may therefore be produced wherever the summer is sufficiently warm to grow that tree. There are also “wild” silk-worms which feed on leaves of other trees—*e.g.*, oak—and whose silk, “**tussur**,” is of a pale fawn colour. For really good results silk-worm culture requires a warm, even temperature, so that commercial production is limited to those mulberry-growing countries which are generally safe from cold in the spring or where, for safety, the culture may be economically carried on under glass.

124. The largest silk producer and exporter is **China** [Fig. 24], where the worm was probably first reared. The silk exports of a country, however, consist of

various grades—from the finest of threads to the cheapest of “waste”; and on looking into export figures one sees that, while the **Italian** export of raw silk is very nearly equal in volume to the Chinese, it is actually double in value; and that the **Japanese** export, although but two-thirds of the Chinese in volume, is also greater in value. This is explained mainly by the fact that both Italy and Japan export a much higher proportion of the best quality of silk and a much lower proportion of waste than China.

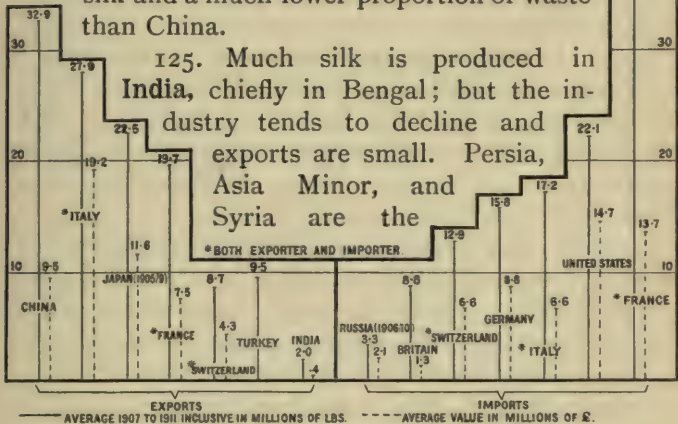


FIG. 24.—RAW SILK: CHIEF EXPORTERS AND IMPORTERS.

only other Asiatic countries cultivating the silk-worm to any extent. **France** follows Italy in production. A certain amount of silk is still produced in the Balkan Peninsula, Spain, and Austria-Hungary; but, except in the last-named country, where the culture of the worm is extending, the industry is small compared with its former extent.

126. France, although the largest actual importer of raw silk [Fig. 24], exports about half the quantity she

receives; so that her net import is just equal in volume to that of the United States, where a wonderful industry has been developed with the aid of a protective tariff. Each of the two countries, as a matter of fact, requires just as much raw silk as Japan exports. Switzerland, although importing more than Britain, re-exports largely, her net import being but half the British, which is mainly "waste" for plush manufacture. It should be carefully borne in mind, however, that all these comparisons have reference only to the *volume*—and not to the value—of the imports.

127. The largest European consumer for manufacture is thus France, Germany coming second with a manufacturing output only one-third of the French in value. Switzerland takes the third place. The British industry is not large, having—except for plush-making—been almost killed by foreign competition.

128. The fact that silk production is practically confined to Europe and Asia is not at all due to the unsuitability of other lands. It is because the whole process of production exacts so much labour and skill that new countries have been unable to undertake it. In the first place labour must be cheap, as it is in all the great silk-producing lands; and, generally speaking, it must have been *trained* in the industry from youth to secure the development of the necessary care and skill.

129. **India-rubber** or **caoutchouc**, **guttapercha**, and **balata** are all similar products varying in hardness, the last-named being the hardest and least elastic of the three. All are obtained in the form of juice from certain tropical trees by making an incision in the bark.

130. **India-rubber**, originally used — as its more familiar name implies—for purposes of erasure, is now

put to a variety of uses too numerous to mention. By the addition of a very small percentage of sulphur it may be converted into hard and durable **vulcanite**, while a larger percentage of sulphur will obtain the still harder **ebonite**. Guttapercha is used for many of the purposes to which rubber is applied, while balata is reserved for uses demanding great toughness and strength—such as belting for machinery and soles for boots.

131. There are many varieties of rubber, their nature and quality varying according to the tree or the conditions under which it is grown. Generally speaking, the tree thrives best in a locality not only well-watered but subject to annual floods. Excessive moisture renders the rubber juice too watery, as insufficient moisture causes it to be too thick. There are varieties of trees which thrive under quite different conditions but yield inferior rubber.

132. The first large commercial supplies were obtained from the valley of the Amazon in **Brazil**, where the trees were found growing here and there in the vast forests. The rubber obtained from this source [Fig. 25] is of the finest quality, and is known as “Pará” rubber from the port of that name near the mouth of the Amazon from which it was originally, and is still mainly, exported. As the vast equatorial forests of the **Congo** and **Niger** basins began to be explored, it was found that they, too, would yield immense supplies, and, although they are still largely untouched and even in great part unexplored, their output of rubber is large and steadily increasing.

133. While much of the world's available supply is obtained from trees growing wild, great progress is being made in many lands with carefully-tended plantations, and rubber trees are also being increasingly

used in coffee and cacao plantations to provide shade [88; 93] and at the same time an additional source of revenue. Production is thus rapidly growing in most suitable lands under the influence of a steadily increasing demand; and the world's output has so increased that the proportion of the Brazilian supply to the whole, formerly two-thirds, is now less than one-third and is being still further reduced.

134. The output of "plantation" rubber is

increasing most rapidly in the Malay States, Straits Settlements, Java, Sumatra and Ceylon (in Asia); in east Africa; and in Mexico and Central America.

135. The life of the rubber-producing industry is threatened

by persistent attempts at the chemical production of an artificial or "synthetic" rubber.

Should the problem be solved, much

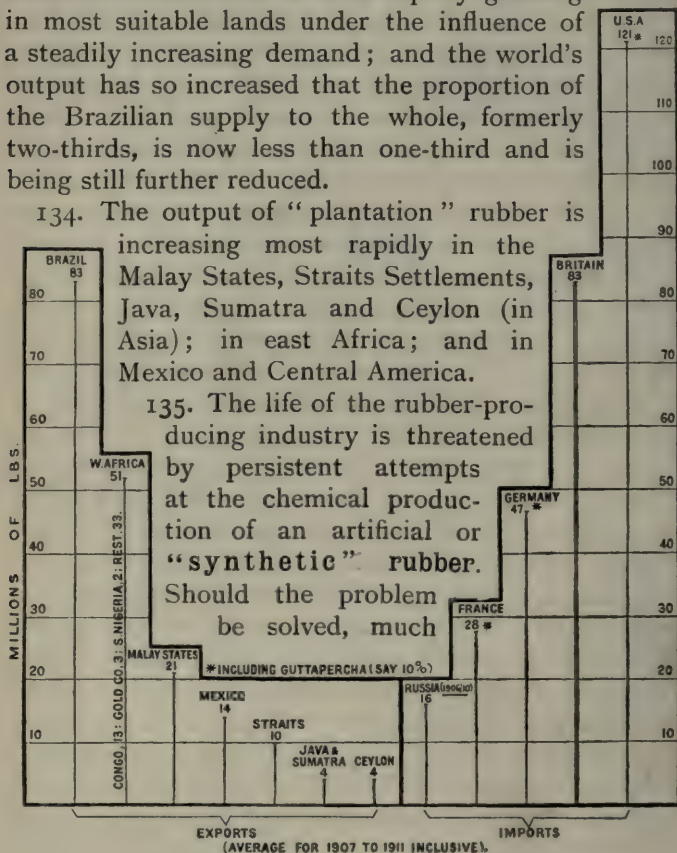


FIG. 25.—RUBBER: CHIEF EXPORTERS AND IMPORTERS.

would depend upon the price at which the substitute could be placed on the market.

136. There are many different varieties of the **tobacco** plant adapted to different conditions, the essential conditions for all being absence of frost and sufficient warmth for growth. The leaves, dried and cured, form the tobacco of commerce.

137. While the wide adaptability of the plant enables it to be grown in almost any region free from frost in summer, few plants reflect so materially, in their products, differences in the conditions under which they are grown. It is this fact alone which has enabled quite a limited number of regions to acquire and retain a high reputation for the flavour of their leaf.

138. **Cuba** stands pre-eminent for cigar tobacco, the cigars being known as "Havanas" from the name of the port of export; and the **Philippine Islands** are similarly celebrated for their "Manilla" cigars. Mexico, Brazil, India and Borneo also enjoy a reputation for cigar tobacco.

139. The **United States** is far the largest producer, her tobaccos being mainly pipe and cigarette varieties; and two states—Virginia and Kentucky—enjoy a world-wide reputation for quality. **Turkish** cigarette tobacco is famed for its aroma. In Europe the plant is largely grown in the following countries, which are mentioned in the order of their production: Austria-Hungary, Russia, Germany, France, the Balkan Peninsula, Belgium and Italy. None of these, however, are exporters to any extent. The Hungarian is said to be the best European tobacco. China exports a considerable quantity, and a large trade is springing up in colonial tobaccos, particularly those of the Transvaal and Nyasaland.

140. The largest importer is naturally the United Kingdom, where the growing of tobacco, which was

prohibited until quite recently, is not particularly successful. Holland comes next as an importer, taking, in spite of her small population, almost half as much as Britain. The Dutchman is the heaviest smoker in Europe.

141. **Timbers.**—The “tundras” or sub-polar frozen lands bear no vegetation beyond the mosses and lichens which spring to life during the slight summer surface-thaw, and provide the wandering reindeer with food. In the northern hemisphere these lands form broad belts enveloping much of North America and Eurasia. As the rigour of the cold decreases and the extent of the summer thaw increases towards the south, stunted birches occasionally make a successful struggle for existence, and still farther south the trees are found to be larger and more frequent until they form at length, with many varieties of hardy coniferous trees, the vast temperate forest-belts containing most of the world’s wealth of useful timber.

142. Coniferous trees—notably, pine, fir, larch and spruce—are the most widely useful, yielding the strong, yet soft and easily-worked timbers¹ so greatly in demand for building purposes and general carpentry; while spruce lends itself specially to the making of wood-pulp from which much of the world’s paper is now made. The wealth of **Canada**, **Scandinavia**, **Russia** and **Siberia** in such timbers is enormous, but so far the Siberian forests, although containing perhaps half of the world’s reserves, are practically useless² because of their remoteness. Similar forests in the

¹ Some trees, especially varieties of the pine, yield resins also, and others, including the birch, barks of use in tanning leather.

² The far eastern fringe, particularly in the Amur valley, is now being utilised, being accessible from the Pacific.

southern hemisphere are found in New Zealand, Tasmania, and the western Andean slopes of southern Chile; but Australia and South Africa are singularly deficient in this class of timber, and require to import considerable quantities for building purposes. The mild oceanic climate of the Canadian Pacific slopes¹ promotes an exceptionally fine growth of large trees including the famous Douglas fir.

143. Towards the south of this temperate forest-belt in the northern hemisphere deciduous trees begin to be prominent, *e.g.*, oak, ash, elm and beech, yielding mainly harder timbers² of extensive use for special purposes demanding hardness and durability,³ and also, to a considerable extent, for cabinet work. The United States and central Europe possess the most extensive available supplies of such timbers, although most other temperate regions are also more or less rich. The suitability of such forest-lands for agriculture has largely led to deforestation—particularly in western Europe.

144. Towards the tropics trees become still harder and darker in colour, and many varieties of the palm appear. It is from the tropical forests of Central and South America, the West Indies and West Africa that most valuable cabinet timbers,⁴ *e.g.*, mahogany, rosewood and ebony, reach the world's markets. India, Burma and Siam furnish nearly all the available teak,⁵ and the forests of Australia consist mainly of varieties

¹ And those of the American states of Washington, Oregon and California.

² And many tanning barks.

³ *E.g.*, barrels, casks, railway sleepers,

⁴ Also various gums and dyes.

⁵ A specially hard wood which resists even the action of worms, and is therefore valued in shipbuilding and for other marine uses.

of the eucalyptus,¹ furnishing specially hard timbers such as jarrah and karri, much valued for use as railway sleepers and in street-paving and the construction of piers.

145. Timbers naturally vary enormously in value, yet standards of measurement differ so greatly that the

only feasible means of comparing exports is by considering their values. It must be remembered, however, that statistics of values should be accepted with great caution for purposes of comparison, as prices are seldom arrived at in any two countries in the same way, and consequently differences may

often be more apparent than real. The results shown in Fig. 26 incorporate nothing but unmanufactured wood and timber and wood-pulp. They take no account of manufactured woods² which enter largely into the

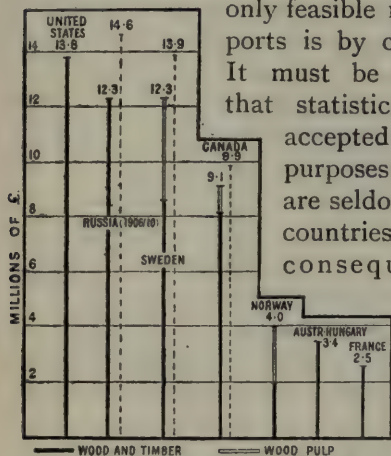


FIG. 26.—WOOD, TIMBER AND WOOD-PULP: CHIEF EXPORTERS.

Averages for 1907 to 1911 inclusive, the dotted lines giving the figures for 1911 only.

foreign trade of many countries, because the value of these may consist mainly of wood or almost entirely of labour expended upon articles containing but a small actual value of wood, and there is no satisfactory means of discriminating between the various products included in available statistics. The widespread export of paper includes a substantial proportion of the product of

¹ Which yield also various resins, oils and barks.

² Which also, in some cases, include wood-pulp.

wood-pulp which, being unascertainable, is also neglected in the Figure. Britain, owing to the deforestation of most of the country to make way for agriculture, is by far the largest importer, taking more than twice as much as the United States export; while the Union, mainly owing to failing supplies of pulp-making wood [671], demands an import¹ almost one-third as great as the British. The growth of the exports of Russia, Sweden and Canada is reflected by the dotted lines in the Figure, although it should be remembered that part of the increase shown is doubtless due to steadily-rising prices.

146. **Animal Products : Meat.**—While sheep thrive best in a dry, warm climate [114], the richer grass of moist climates is more suitable for cattle, and coolness is an additional advantage in dairying. In temperate oak and beech forests, as in Italy and the Balkan Peninsula, swine thrive on the “mast” or fallen nuts, but they are more commonly fed—notably on maize [68]. Most countries are thus able to produce at least a substantial part of their own meat requirements.

147. The world's meat-production is not increasing in proportion to the demand, the result being a general rise in prices, which is now stimulating production in suitable new lands such as Argentina, Canada, Siberia and South Africa. In continental areas like the three first-named, where the climate over large areas is too dry for agriculture by ordinary methods, the natural grazing encourages the widespread rearing of animals; and the chief sources of supply of various kinds of meat [Fig. 27] are seen to be the **United States and Argentina**. In the export of the former swine products² predominate,

¹ About two-thirds of which is wood-pulp.

² Bacon, ham and pork.

partly because the large maize-crop [69], supplying an ideal swine-food, expressly encourages that profitable form of production, and partly because the home production of beef is increasingly consumed in the country; while Argentina furnishes both meat and mutton, the rich, warm northern grazings yielding the former, and the drier southern expanses the latter.

148. The rich grass-land of moist, cool **Denmark** particularly favours cattle-rearing and explains the large export of beef in addition to bacon and ham; while the warm, dry climate of eastern **Australia** and **New Zealand** enables those lands to devote special attention to mutton as an adjunct to wool-production [118], although beef is also important and likely to develop largely in Australia [485,502]. **Uruguay**, like northern Argentina, exports mainly beef,¹ and **Canada**, where the industry will always be subordinate to agriculture [626], exports at present little but ham and

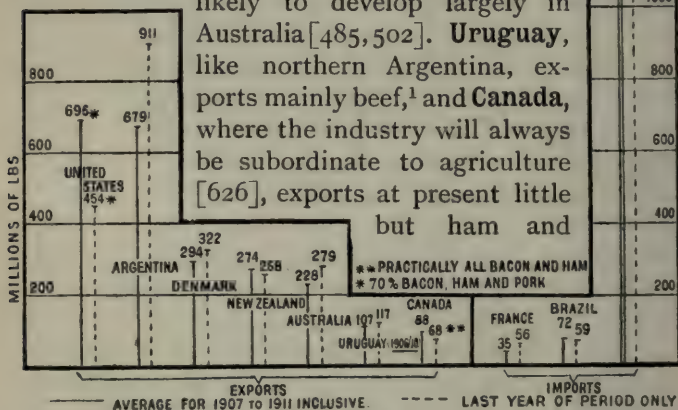


FIG. 27.—MEAT (INCLUDING MUTTON, BACON, HAM, PORK, ETC.): CHIEF EXPORTERS AND IMPORTERS.

¹ Both countries also export large and increasing quantities of meat extracts.

pork. Britain is far the heaviest importer, the home supply having long been utterly inadequate. The increase of her import and of the Argentine export and the equally notable decrease of the United States export are evidenced by the dotted lines in the Figure.

149. A comparison of figures relating to the United States and Argentina [Fig. 28] forms a fitting parallel to the course of the wheat export discussed in § 66. The former country has almost reached the limit of

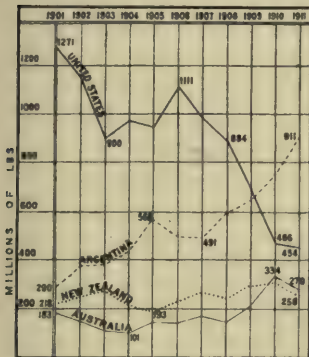


FIG. 28. — MEAT (INCLUDING BACON, HAM, PORK, MUTTON, ETC.): FLUCTUATION OF EXPORTS.

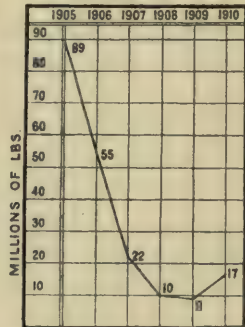


FIG. 29. — DECLINE OF SOUTH AFRICAN MEAT IMPORTS.

production, while her meat-eating population continues to increase. The growth of meat-production in South Africa is vividly illustrated by the rapid decline of meat-imports from Australia upon which she formerly depended [Fig. 29].

150. Many countries export meat in the form of live-stock, more particularly cattle. Such are Sweden, Denmark and Holland, for example, and even the United States, Canada, Argentina and Uruguay; but

the risks involved in long journeys and the perfection of cold storage tend to restrict this form of trade except between adjacent lands.

151. **Butter and Cheese.**—Cool, moist climates, *e.g.*, those of Denmark, Sweden, Holland and eastern Canada, are ideally suitable for dairying, and the industry thrives particularly where **co-operative methods** are adopted. This implies the combination of farmers in a district, who subscribe jointly the cost of erecting and maintaining a creamery. All those who share in the enterprise send their milk to the creamery, obtaining credit for the quantity; the milk is mixed and the cream removed, the skimmed milk being returned to the farmers for feeding purposes when they bring in the next supply of fresh milk. Several such creameries may supply a single butter factory established on similar lines. Uniformity of quality and economy of production are the chief advantages of this form of industry. The butter is more uniform because made from the mixed cream of various creameries, which in turn is obtained from the mixed milk of many farms; and it is obviously made at a less total cost than would be the case if each farmer were to make his own small quantity of butter. The butter, when sold at market rates, leaves a satisfactory margin of profit for the factory, which pays a half-yearly dividend to the subscribers. Co-operative cheese factories are conducted on similar lines.

152. **Government grading**, where compulsory, is also a great help to production. It implies classification by government inspectors according to quality, which is ascertained by scientific examination. Butter to be graded, *e.g.*, in Australia, is awarded a certain number of “points” or “marks” for each aspect of its

quality—flavour, aroma, texture, moisture, colour, salting and packing; the product awarded 95 or more of the full 100 points denoting perfection is graded as “superfine,” that obtaining from 90 to 94 points as “first grade,” and so on down to “pastry” butter, where the points obtained are less than 75. This is a great advantage to both buyer and seller; the former knows that, in buying, say, “superfine” butter, he is buying an article of a recognised degree of excellence, and that he may safely buy on the strength of the official certificate without actually seeing the butter. He is thus encouraged to buy more regularly and more freely, and the result is a larger and more regular market for the seller.

153. **Cold storage** has made possible the conveyance of butter in good condition even from New Zealand to

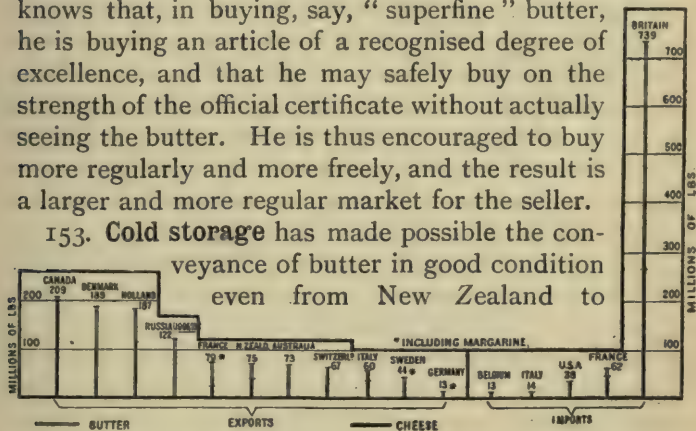


FIG. 30.—BUTTER AND CHEESE: CHIEF EXPORTERS AND IMPORTERS.

Averages for 1907 to 1911 inclusive.

Britain, a distance of over 12,000 miles. **Canada** leads in the export of dairy produce [Fig. 30], the bulk being cheese sent mainly to Britain; and Britain is again much the largest importer. Danish butter is exceptionally fine, and is even sent in air-tight cans to tropical lands. Dutch, French, Italian and Swiss cheeses are noted, and the British product is also particularly fine. Most of the Russian butter comes from distant Siberia. **Margarine** and **artificial butter** are important products in Holland and Germany.

154. **Eggs**, mainly under the influence of an enormous German and British demand which is only fractionally satisfied by home production, form quite an important line of international trade. The outstanding sources of supply are Siberia and Hungary, where the dry climate and abundance of grain favour poultry-rearing, and where rapid and efficient train services provide quick transport to Baltic and North Sea ports respectively¹ and to German markets. Millions of eggs are also exported by Denmark, Italy, Bulgaria, Rumania, France and Egypt. Danish eggs, like the dairy products of that country, are particularly irreproachable, owing to state inspection and the imposition of a heavy fine on farmers supplying even a single questionable egg.

155. **Fish**.—The three great fishing-grounds of the world are those of the North Sea, the Atlantic shores of North America and the Japanese waters in Asia. In all three cases their existence is due to the presence of submarine “banks” which furnish fish-food and act as spawning-grounds, while the exceptional richness of the Newfoundland Banks is due to the receipt of large deposits of earthy débris yielded by melting icebergs brought down by the cold Labrador Current [Fig. 3] from the Arctic regions. Enormous supplies are drawn regularly from these sources by the fishing fleets of many lands, even France, for example, exercising fishing rights off the coast of Newfoundland.

156. The most important varieties caught are cod, herring and salmon, the two first named being common to practically all sea-fisheries. The salmon, living alternately in salt water and in fresh, is commonly caught in quantity in the estuaries of rivers, particularly in Alaska and British Columbia. The necessity for the

¹ For shipment to Britain.

preservation of a commodity so perishable as fish, has led to the development of great industries engaged in salting, curing, drying or canning, without which the great fishing countries could not supply the heavy demand of other lands, particularly of Catholic countries like those of Europe and Central and South America.

157. Salted cod reaches the American countries in large quantities from Canada and Newfoundland, while the European demand is satisfied mainly by salted cod from Norway and salted herring from Norway and Britain. Canned salmon is shipped in vast quantities from the fiords of Alaska and British Columbia. **Britain** leads in both export and import of fish. As an exporter she is followed by Norway, Canada, Holland, Newfoundland and the United States, and as an importer by Italy, the United States, France, Russia, Germany, Spain, Belgium, Portugal and Brazil—in the order named. Rich sea fishing-grounds not fully developed, which will probably assume importance in the future, are those off the shores of British Columbia and Australia.

158. **Coal** is the most important mineral product from the point of view of industrial development. The **United States**, whose vast fields contain rich seams quite near the surface and therefore easily and cheaply worked [549], is far the largest producer [Fig. 31], accounting for two-fifths of the world's output. **Britain**, the second producer,¹ with her deeply-sunk seams involving expensive production, led the world till 1898, when she was overtaken by the United States; and **Germany**, the third producer, is steadily gaining ground, though it should be remembered that one-

¹ Accounting for one-fourth of the world's output.

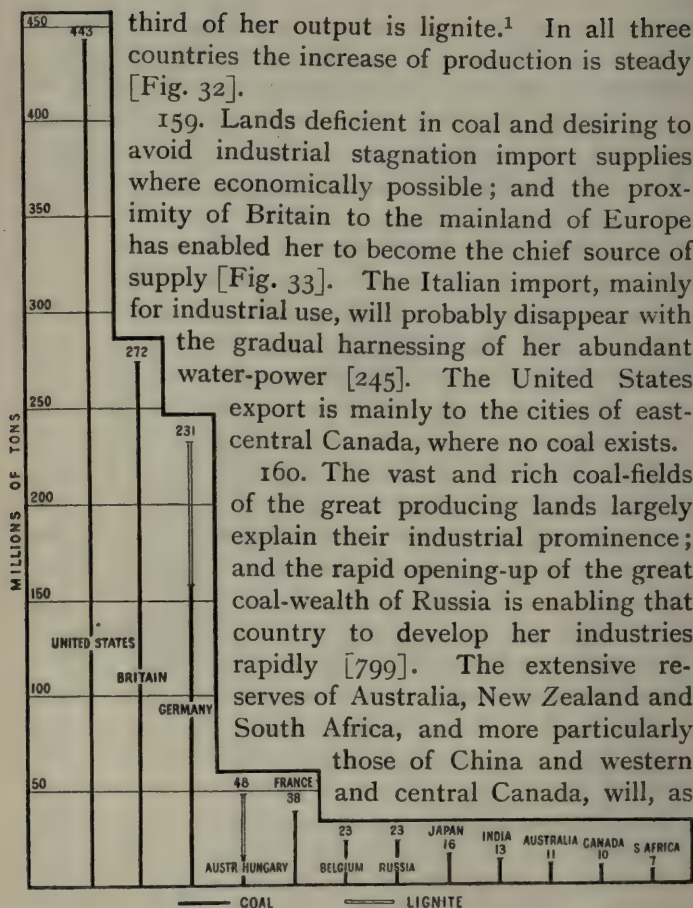


FIG. 31.—COAL: CHIEF PRODUCERS IN 1911.

discussed in later paragraphs, have far-reaching effects in the future.

161. The industrial standing of a country, where

¹ Brown coal, of inferior heating power.

water-power does not enter into the question, is commonly gauged by figures showing the consumption of coal per head of the population. Up till 1886 the British figure was twice that of the United States, which was then still mainly agricultural, and thrice that of

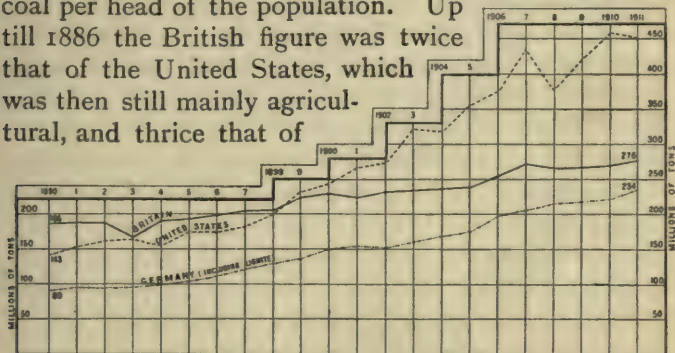


FIG. 32.—COAL PRODUCTION IN THE THREE LEADING COUNTRIES.

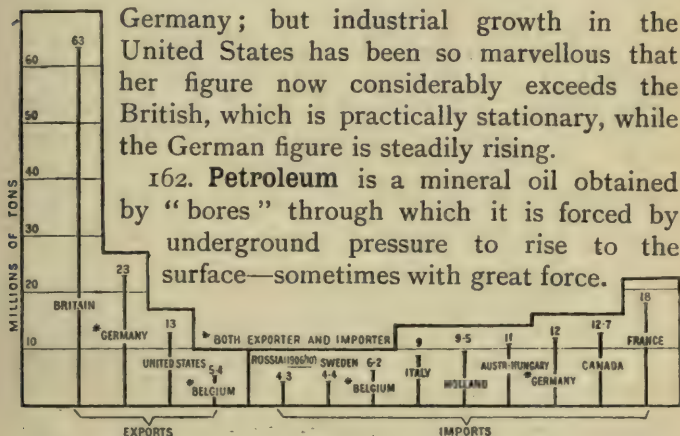


FIG. 33.—COAL AND COKE: CHIEF EXPORTERS AND IMPORTERS.
Averages for 1907 to 1911 inclusive.

From it are derived oils, both illuminant and lubricating, as well as highly inflammable and volatile liquids such as gasolene and petrol and the familiar ointment known

as vaseline. Petroleum reserves are widely distributed, but they are seldom easily located; and at present the **United States** and **Russia** produce between them all but a fraction of the world's output. In the former, production during recent years has increased so rapidly that it is now three-and-a-half times as great as that of Russia. By their nature petroleum deposits become exhausted in time, and the older wells of both countries show signs of failure; but newer wells in California now produce one-third of the total American yield, and, owing to the increasing value of oil as a motive power [42; 59], atone to that state for its almost absolute lack of coal. Rich stores, believed to exist in Syria and throughout Japan, are now being assiduously prospected for; and various parts of Canada are already yielding largely [525].

163. **Natural gas** is similarly obtained by bores, and is of great industrial use while the supply lasts. The large stores of the United States are approaching exhaustion, while vast Albertan reserves in Canada are just coming into use. Unfortunately, as in the case of petroleum, the *force* of the supply prevents efficient control, and probably as much is lost by leakage as is secured for use.

164. **Iron** is the most useful of metals. Converted into steel, it is employed in the construction of an infinite variety of useful commodities demanding strength and durability. It is commonly found in the form of ore, which requires to be smelted in coke furnaces; and limestone added as a "flux" to the molten metal absorbs impurities. The iron is poured into moulds from which the "ingots" are taken when cool—the "**pig-iron**" of commerce. It is thus evident that iron will be produced most cheaply—other

considerations apart—where ore, coal and limestone occur in close proximity; and the combination of the three on the various British coal-fields gave Britain her predominance in production long before other lands entered into serious competition.

165. The cheapness of iron resulting from keenness of competition in production makes it unprofitable to work many deposits—some of them quite rich—which

are remote from coal, limestone or markets. This is particularly the case in the United States, where Alabama alone, in which Birmingham is the centre of the industry, possesses the triple combination of ore, coal and limestone within convenient reach of demand centres;

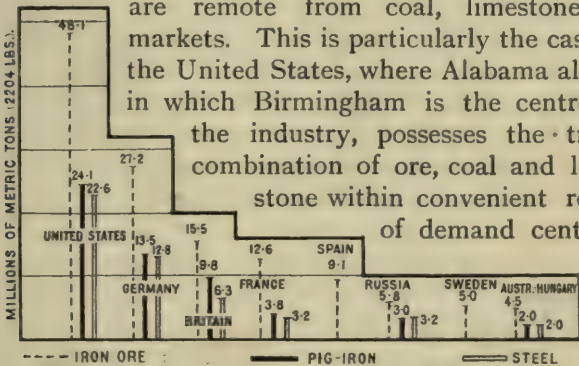


FIG. 34. — IRON AND STEEL: CHIEF PRODUCERS.

Averages for 1907 to 1911 inclusive.

but the exceptional richness of Lake Superior ore and the ease with which it is mined [550] compensate for the cost of transport to the Pittsburg smelting region. Low-grade ore is sometimes economically worked, when crushed, like the sand-iron deposits of Japan [370], by a magnetic process, metal-bearing particles being separated from the mass by magnetic attraction and smelted.

166. The United States is now the largest producer of ore,¹ as well as of iron and steel [Fig. 34],

¹ Accounting for over one-third of the world's output.

Germany producing little more than half as much and Britain but one-third. Most countries smelt and work their own products, but exceptionally fine Spanish and Swedish ores are greatly in demand in other lands, particularly in Britain,

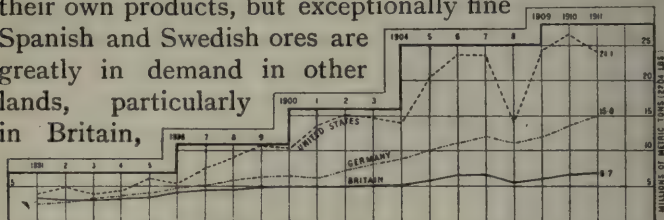
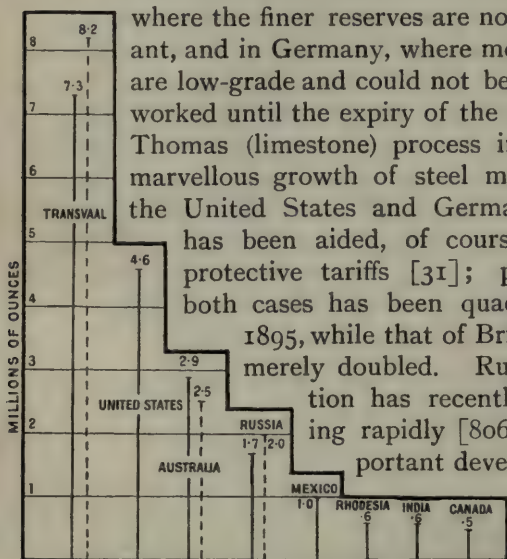


FIG. 35.—STEEL PRODUCTION IN THE THREE LEADING COUNTRIES.



— AVERAGE, 1907-1911 INCLUSIVE. --- FIGURE FOR 1911 ONLY

FIG. 36.—GOLD: CHIEF PRODUCERS.

where the finer reserves are now less abundant, and in Germany, where most of the ores are low-grade and could not be economically worked until the expiry of the patents of the Thomas (limestone) process in 1894. The marvellous growth of steel manufacture in the United States and Germany [Fig. 35] has been aided, of course, by heavy-protective tariffs [31]; production in both cases has been quadrupled since 1895, while that of Britain has been merely doubled. Russian production has recently been growing rapidly [806], and an important development is to

be looked for in Canada; while the great possibilities of

China [366] should be specially noted.

167. The production of iron and steel goods including machinery is conducted on an exceptionally

large scale in the United States, and, with the aid of skilful organisation, at a comparatively low cost; hence her export of such goods has increased remarkably and competes seriously in other lands with British products. Similar remarks apply more moderately to the German industry. In certain special lines, however, such as textile machinery, the superiority of British skill places her product beyond the reach of competition at present.

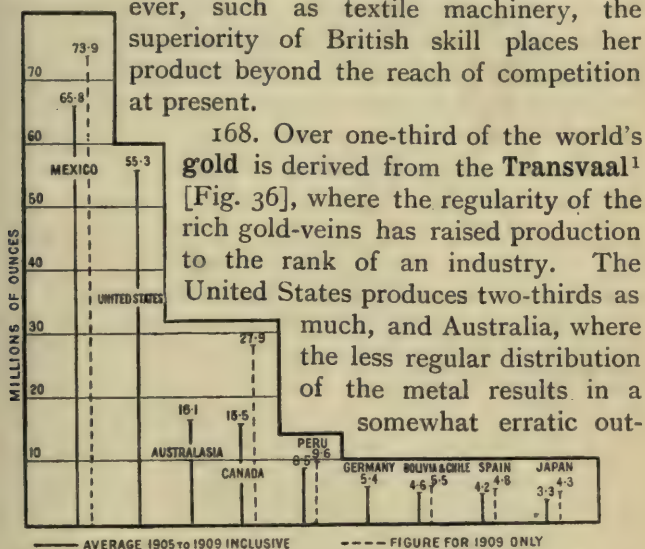


FIG. 37.—SILVER: CHIEF PRODUCERS.

put, about one-third. A large future yield is looked for in Rhodesia. Mexico leads in the mining of silver [Fig. 37], accounting for one-third of the world's output; the rich mines of the United States yield almost as much, and Australasia and Canada each about one-fourth as much.

169. **Copper** is largely used as an alloy in the making of brass and bronze, but its chief importance is now

¹ Where production is steadily increasing.

due to its extensive use as a conducting medium in the rapidly-growing electrical industries. The **United States** produces over three-fifths of the world's supply. Mexico, Spain, Japan, Australia and Chile are other large producers, and Canada is rich and likely to be largely productive. **Tin**, alloyed with copper, makes bronze; but its chief value is as an agent in the making of tinplate. The **Malay Peninsula** accounts for the bulk of the supply, the neighbouring Dutch islands of Banka and Billiton also contributing largely; and Bolivia and Australia and the ancient Cornish mines in England are other important sources.

QUESTIONS

13. Why is it practically impossible to grow grain in Britain at a greater elevation than 1,000 feet, when it may be grown successfully in Ecuador at an elevation of over 9,000 feet?

14. Is the rise in the Canadian wheat export [Fig. 11] likely to continue? Give reasons for your answer.

15. A substantial fall in meat prices might lead to a heavy export of maize from the United States. Why?

16. Why does Holland so frequently appear as both an importer and an exporter of the same commodity?

17. Give reasons why sugar-beet would be a desirable crop for England.

18. Explain the reasons for regarding Southern Nigeria as a large future producer of cacao.

19. Would it be safe to infer from Fig. 23, by a comparison with the Australian and British figures, that the output of the woollen industries of the United States is more than half as great as that of British industries?

20. Why is it seldom safe to estimate the extent of the growth or decline of exports or imports by a mere comparison of values?

21. Make a list of familiar articles illustrating various uses to which india-rubber is put.

22. How would you justify the description of forests as a "crop" in the agricultural sense? What would you recommend as a wise policy in cutting?

23. Endeavour to trace a connection between the results shown in Figs. 32 and 35.

24. Mention several facts tending to show that the United States will soon cease to be an important source of food-supply.

CHAPTER III

THE MEDITERRANEAN REGION

170. THE latitude at which, in the northern hemisphere, Trades and Anti-Trades take their origin, fluctuates with the changing of the seasons [13] from about the 32nd to about the 42nd parallel; and the Mediter-



FIG. 38.—THE MEDITERRANEAN CLIMATIC BELT.

anean region, isolated by lofty mountains and vast deserts, lies mainly within this belt [Fig. 38]. The Trades thus always blow *away* from the region, and only in winter do the Anti-Trades originate sufficiently far south to blow *into* it; so that the first characteristics of the climate are **winter rains** and **summer drought**.

171. These characteristics are accentuated by winds

originating within the region itself. In summer they are drawn southward by the intense heat of the Sahara; but the flatness of the land allows the water-vapour to pass over the desert uncondensed to the region of equatorial rains [459]. In winter the normal S.W. Anti-Trades are associated with cyclonic storms and relief rains on the mountainous northern shores.

172. The Mediterranean itself is a vast sheet of deep water over 2,200 miles long, whose only oceanic outlet is the nine-miles-wide Strait of Gibraltar; so that it is practically land-locked and almost tideless.

173. The high temperature causes the evaporation of much more water than is furnished by rivers, so that the sea is excessively salt; and its consequent density and lowering of surface lead to regular inward currents from the Atlantic and the Black Sea to replace the saltier water which flows outward at a lower level. This generates regular currents within the sea itself, some causing considerable trouble by "silting" at various parts of the coast.

174. **Silting by Rivers.**—In this Mediterranean region, with its steep slopes, rivers are often merely mountain torrents, sweeping down soil in large quantities and depositing it on the sea floor. In course of time this "silt" fills up the sea around the river mouths, and further deposits have to be carried over the filled-up area to reach the sea. River action may thus gradually extend the shore-line seaward, as, *e.g.*, at Ephesus, and at Arles on the Rhone, both formerly flourishing seaports and both now some distance inland. This action is not confined to suddenly flooded streams, but is performed by all rivers; the gentler the action, the more gradual the process.

175. **Silting by Currents.**—The steady flow of a

current along the shore may be a powerful silting agent. Passing the mouth of a river, it will catch and sweep away any soil brought down by the river before it has time to settle, depositing it along the shore or against the first obstacle. Sometimes a current will even carry fine sand from one part and deposit it at another. Such a current travelling *westward* past the Rhone led to the location of Marseilles at the *eastern* side; and the same current farther west causes endless trouble to ports on the western shore of the Gulf of Lions, some having been closed by silting (*e.g.*, Narbonne, Aigues Mortes, etc.), and others being kept open with difficulty and at great cost (*e.g.*, Cette).

176. Where the heights receive sufficient rain for forest growth, the chestnut and the walnut prevail; evergreens—mainly of the oak genus, and the pine, which can withstand considerable drought—characterise drier parts. Most summer cultivation requires irrigation [24], and the **natural vegetation** consists of long-rooted plants which can reach deep-sunk moisture. Such are the vine, olive, fig and orange; also lucerne, a kind of clover, which furnishes excellent grazing and *enriches* rather than impoverishes the soil. Maize, tobacco, and—to a less extent—cotton and rice are also raised in many parts. Wheat is important, growing rapidly in the mild, moist winter.

177. The warmth of the Mediterranean water promotes the growth of sponges and coral, the sponges of Greece and Syria being the finest on the market; and sardines, anchovies, and tunny-fish are important.

178. The great climatic difference between Central Europe and the Mediterranean region, separated by lofty mountains, guarantees the production by each of commodities required, but not produced, by the other;

this leads to an important north-and-south traffic rendering the few available routes of supreme value.

179. Despite the frequency of storms, **early navigation** was encouraged by regular winds and currents, good harbours, and peninsulas and islands provoking exploration and adventure. The Phœnicians first ventured from Tyre and Sidon to distant Spain, and even to Britain for tin to alloy with the copper of Cyprus for bronze. Tyre derived importance from the convergence of Asiatic trade routes *via* Damascus, bringing Asiatic products to be exchanged for those of Europe and North Africa brought by sea.

180. Greece and Rome, in turn, similarly developed into maritime trading powers and, like the Phœnicians, established colonies at various points, many still existing as flourishing cities. With the rise of civilisation in central Europe Genoa and Venice came into power, both commanding Alpine routes northward; but the falling of overland Asiatic routes into Turkish hands late in the fifteenth century and their consequent insecurity diverted Asiatic trade to the newly-discovered Cape route, and well-nigh ruined both ports. The cutting of the Suez Canal, however, reinstated the Mediterranean as the great trade-route between Europe and Asia, and restored to both cities much of their lost importance.

SYRIA

Asiatic Turkey includes Syria, Asia Minor, Mesopotamia and Arabia. Area of Syria, 114,530 square miles (= Britain); population, estimated, 3,675,100 (= $\frac{1}{2}$ Greater London).

181. North and south through Syria run two parallel mountain ranges enclosing the deep-sunk Jordan valley.¹ The seaward range, broken where the

¹ The Dead Sea surface is 1,300 feet below sea-level.

plain of Esdraelon gives access to the sea, overlooks a rich coastal plain, narrow in the north but widening westward to the south; the inner range edges the inland plateau, which continues southward as the great sandy Arabian desert and slopes gently eastward to the Euphrates.

182. The central depression, through which the Jordan flows southward for over a hundred miles into the Dead Sea, is part of the *Great Rift Valley* [486], the result of a rift or splitting of the earth's surface along two more or less parallel lines and the sinking of the surface between. The Dead Sea has no outlet; the valley is therefore a basin of **inland drainage**. A lake or sea so situated tends to become salt, as the water poured into it by rivers steadily evaporates, while the various salts brought down in solution—obtained by the rain in its filtration through the soil—remain behind. The Dead Sea is excessively salt.

183. **Climate**.—The mountains guarantee to the coastal plain a fair winter rainfall. The deeply-sunk Jordan valley, completely sheltered, is—owing to the latitude—intensely hot; the rainfall is slight, but, most of the valley might be irrigated from Lake Tiberias. The inland plateau is both hot and dry, but, where crossed by streams—as in the Hauran district—productive by irrigation. The mass of the land, being limestone, quickly gains and loses heat, thus giving rise to regular and punctual land-and-sea breezes [16].

184. **Deforestation**.—Great forests have been ruthlessly cut down, the country being now to a large extent “deforested.” Rains which, intercepted by foliage, formerly filtered slowly through root-bound soil, thus beat directly upon exposed heights and in time swept them bare of soil. Deforestation may con-

vert regularly-flowing rivers into channels at one time filled with raging torrents and at another practically dry, the rain which feeds them reaching them quickly over the denuded surface instead of keeping them regularly and moderately supplied by filtration through the soil. Deforestation, if sufficiently extensive, may even directly affect the climate. Conscious of these facts and of the risk of exhaustion of the world's available timber supply, enlightened countries now promote schemes of afforestation.

185. Bad government and deforestation have together reduced Syria to a fraction of her former importance.¹ Much of Asiatic Turkey,—especially in Mesopotamia,—formerly assiduously irrigated and tilled, is now waste. Only a small part of the rich Hauran district is under cultivation, although it is slowly being repopled by immigration.

186. **Products.**—Most of the country, being of porous limestone, is essentially pastoral [114], and wool is largely produced. The olive, fig and vine, though less important than formerly, are still grown on the hill-sides, where ruined terraces are now in parts being repaired. The mulberry thrives on the slopes of Lebanon, and silk is important. The rich plains of Sharon and Philistia grow cereals, cotton and fruits, while the real “Damask” (Damascus) roses are noted, and the manufacture of oil (attar) of roses is encouraged by Government. The oranges of Sharon are named from their port of export—Jaffa. Tobacco is a valuable crop at Latakia. Palms, oranges and bananas thrive in the tropical Jordan valley. Salt and iron are produced near Aleppo, and the finest sponges [177] are obtained off the coast.

187. **Industries.**—Wool, cotton and the silk of

¹ The population was formerly ten times as great as at present.

Lebanon are all manufactured at **Damascus** (350,000), which derives great importance from the convergence of many caravan routes upon the Abana oasis in which it lies. Soap-making is characteristic, oil being obtained from the olive and soda from plants which thrive on the saline desert soil. The manufacture of glass, for which the ancient Phœnicians were famous, is reviving, the shore sand being peculiarly suitable.

188. The **ports** are mostly roadsteads, with sheltering islands or capes; but the regularity of land-and-sea breezes [183] generally ensures calm nights and safe anchorage. The chief ports and the most numerous are in the north, there being only two to the south of Mount Carmel—**Jaffa** (45,000) and **Askelon**. There are several reasons for this. The narrowness of the crowded northern plain made the early Phœnicians sailors, Lebanon cedar providing them with ships; while the width and fertility of the southern plain encouraged agriculture and the growth of inland towns. In the second place the shore of the southern plain, washed by a silt-laden current [175] from the Nile, is unsuitable for ports; and in the third place the northern coast is more readily accessible for Asiatic trade *via* Damascus.

189. **Beirut** (150,000), the chief port, is only seventy miles from Damascus by rail, while Haifa is double that distance; but **Haifa** is within eighty miles of the Hauran wheat-lands [185], whose development, if proposed harbour works at Haifa were constructed, would enable that port to outstrip Beirut. Tyre, Sidon and Acre are all ancient ports of note, the first-named being still the terminus of a road from Damascus which might well be followed by a railway. Iskanderun (or Alexandretta), the port of Aleppo (210,000), should profit greatly by connection with that town by rail.

190. **Foreign Trade.**—The chief **exports** are naturally wheat, fruit (particularly oranges and figs), wool, hides and tobacco; the chief **imports** being textile fabrics and ironware.

191. The main possibilities for **the future** lie in the development of agriculture on the coastal plains and in districts like the Hauran, and in the discovery of mineral oil, which is believed to abound in the Jordan Valley; but improved government and transport are necessary to real development. Agricultural colonies—mainly of Russian Jews—are growing on the plains of Sharon and Philistia under Government encouragement.

ASIA MINOR

Part of Asiatic Turkey. See note to Syria, p. 85. Area (with Armenia and Kurdistan), 269,701 square miles (=twice Britain); population, estimated, 12,980,100 (=½ Britain).

192. Asia Minor is mainly a great plateau, sloping gradually from an average eastern height of 6,000 feet to an average of 2,500 feet in the west, where it is furrowed by broad river valleys opening to the Ægean, providing useful estuaries and harbours and offering natural routes to the interior. The northern and southern plateau edges rise as mountains presenting steep outward slopes to the sea; and at two points on the south coast the Taurus range recedes to accommodate the rich plains of Pamphylia and Cilicia. From the eastern end of the Taurus the Anti-Taurus range crosses the plateau north-eastward towards the eastern end of the Black Sea. The configuration thus causes traffic to pass mainly *east and west*, and at the same time lends special value to the few convenient passes leading to the Black Sea and the Mediterranean.¹

¹ Particularly the Cilician Gate.

193. **Climate.**—Black Sea summers are warm and damp, and the winters cold and wet with considerable snow. The Ægean and Mediterranean coasts, like that of Syria, receive a fair winter rainfall. The plateau edges keep the interior so dry that much of it is desert, and areas of inland drainage [182] have become vast salt plains with marshes and lakes.



FIG. 39.—SYRIA AND ASIA MINOR: RAILWAYS AND TOWNS.

194. **Products.**—The exposed Black Sea slopes are heavily forested—mainly with oaks, firs and beeches. The olive, fig and vine thrive on the Ægean and Mediterranean coasts. The rich plain of Cilicia, aided by a railway inland from Mersina [Fig. 39], is being steadily developed. Wheat, cotton, silk, sesame and other valuable commodities are raised, and spinning and

weaving are increasingly important at Tarsus and Adana. Western valleys yield fruits, wheat, barley, maize, rice, cotton and liquorice; and there are extensive opium fields in the neighbourhood of Smyrna and Konia. The mulberry grows round Smyrna and Brussa (110,000), where silk has been manufactured for centuries. Northern valleys grow excellent wheat and barley and fine tobacco.

195. Much of the plateau is naturally rich; and where irrigation is possible, as round Sivas, Konia and Angora, excellent wheat and fruits are grown. Vast stretches of poor grass-land produce exceedingly fine wool [114] and hair, especially round Angora, Konia and Kaisaria.

196. **Mineral wealth** is great but much neglected. Coal and iron are both found, also gold, silver, copper, lead and antimony, and special products like alum, rocksalt, meerschaum, and emery; but only the last three are worked to any extent. There are many fine marble quarries, and petroleum is found in places.

197. **Industries** are mostly *domestic, i.e.*, carried on by workers in their own homes. In addition to those already named Turkey rugs and carpets and mohair cloth are manufactured. Many make articles of beaten copper and brass. Soap [187] and wines are made, and sponge-fishing [177] is followed on the Ægean and Mediterranean coasts. Flour-milling is increasingly important at Smyrna.

198. **Communications and Trade Centres.**—Transport is still mainly by camel caravan. In Roman times good roads existed for wheeled vehicles; but, with the coming of the Turks, neglect and decay prevailed. Only within the last thirty years has an improvement begun with the introduction of railways.

199. Asia Minor not only forms a link between Europe and Asia, but commands the overland Mesopotamian route to India [200]. The configuration concentrates traffic upon **Skutari**, opposite Constantinople, and **Smyrna** (375,000), after that city the largest town in the Turkish Empire. Smyrna communicates easily with the interior by the Gediz valley, and has a fine natural harbour which was saved from being silted up, like that of Ephesus [174], by the diversion of the Gediz. **Erzerum** (80,000), the meeting-place of many caravan routes, is a great trade centre and emporium (*cf.* Damascus, § 187) near the fertile Lake Van region. Caravan routes through easy passes over the Anti-Taurus converge upon **Kaisaria** (54,000), an ancient trade centre and the most important town on the plateau.

200. The important **Baghdad Railway**, which will connect Skutari *via* the Cilician Gate with Mosul, Baghdad, Basra and a port on the Persian Gulf, will provide a new land route to India, and will greatly aid the development of lands traversed by it [Fig. 52].

201. **Ports**.—On the Black Sea **Samsun** and **Trebizond** (51,000), the ports of Sivas (65,000) and Erzerum respectively, do the most trade, although the latter suffers from competition by Russian railways [304]. **Mersina** has rich Cilicia for its hinterland, and **Adalia** serves Pamphylia. Skutari has a large transit trade across the narrow Bosphorus to Constantinople; but Smyrna conducts most of the external trade.

202. **Foreign Trade**.—The **exports** are naturally varied, the chief being raisins, figs, wheat, barley, silk, mohair, cotton, carpets, rugs, tobacco, liquorice, opium, olive oil, sponges and valonia. The chief **imports** are textile fabrics, ironware, coal, petroleum and sugar. Most of the foreign trade is with Britain.

203. The **islands**, as a rule, are fertile, general products being fruit, raisins, wine, olive oil and mastic. The main industry is sponge-fishing. The larger islands have good harbours and steam communication with Smyrna.

204. **The Future.**—The country is being steadily deforested [184]. Agriculture is primitive, mineral production small, and transport hampered by interstate tariffs; yet the reform of Turkish government, with re-colonisation from Europe and the extension of the railways, should lead to a prosperous future.

CRETE

Area, 3,400 square miles (=about $\frac{1}{2}$ Yorkshire); population, 310,200 (= $\frac{3}{4}$ Leeds).

205. Crete and the adjacent islets form an autonomous state under a High Commissioner of the Great Powers nominated by the King of Greece. Crete itself is mountainous, with several small fertile plains producing grain and fruits. On the hill slopes the olive and vine are grown, and sheep and cattle pastured. There are a number of tanneries and soap-works. The trade is chiefly with Greece and Turkey; the **exports** include olive oil, carobs, soap, raisins and wine, and the **imports** flour, leather wares, fish, cotton yarns, rice, sugar and timber.

CYPRUS

Area, 3,580 square miles (= $\frac{2}{3}$ Yorkshire); population, 237,000 (=thrice York City).

206. Cyprus, formerly tributary to Turkey, was annexed by Britain in November, 1914. It consists of a central plain—the Mesorea—bounded north and south by limestone ranges. The forests of the abrupt northern range have long been cut down for ship-

building and for smelting the copper for which the island used to be famed.¹ The southern range, still heavily forested, is used as a summer station for British troops.

207. The effectively screened central plain receives little rain ; but it is fertile, and irrigation is extending. Rivers are mostly torrents in winter and dry courses in summer ; and the shallow lakes dry up in summer, leaving extensive salt deposits. Visitations of locusts, formerly disastrous to agriculture, are promptly handled by the digging of trenches into which the advancing hordes fall, and in which they are promptly buried.²

208. **Products** are consistent with the configuration and climate. Cereals, carobs, cotton, sesame and salt are obtained from the plain ; wool and leather from the barren limestone heights ; the vine, the olive, and the mulberry (for silk) are grown on the southern slopes ; and sponges are obtained on the coast.

209. **Commerce and Ports.**—**Exports**, steadily growing, include carobs, wheat and sesame ; the chief **imports** are textiles, flour, sugar, timber and leather goods. Larnaka, the chief port, is a mere roadstead ; the only real harbour, that of unhealthy Famagusta, requires extensive dredging.

THE BALKAN PENINSULA

210. On the west the Dinaric Alps and their southern extensions descend steeply to the Adriatic, while the forested Balkans in the north stretch eastward almost to the Black Sea, the two ranges converging in the north-west. The country between them consists mainly of rugged highlands, broken up by river valleys

¹ Mining has been recommenced.

² This treatment is only effective with locusts in the wingless stage. Where, as in South Africa, the winged insect is met with, other, though less effective, measures are adopted, *e.g.*, the destruction of eggs.

opening towards the Ægean Sea and the Danube. The only real cross-country break allows the Gulf of Corinth almost to sever southern Greece (the Morea) from the rest of the peninsula.

211. The most important Ægean valleys are those of the Maritza, crossing the diamond-shaped eastern plain, the Salambria, which expands into the triangular plain of Thessaly, and the Struma and the Vardar, which enter the Ægean on either side of the three-pronged peninsula of Chalcidice. The chief northern valley is that of the Morava, joining the Danube near Belgrade.

212. The deforested western highlands are bare limestone. Owing to their porous and soluble nature, rivers, often literally mountain torrents, have cut deep gorges and sometimes even disappear altogether into the mountain-sides to break out elsewhere at a lower level. The surface is thus most difficult and desolate. Such a country is termed "**karst**"¹ **land**. The central highlands, on the contrary, are mainly masses of old crystalline rock, still well forested.

213. **Climate.**—The west coast receives a heavy rainfall—almost entirely in winter, of course, for it enjoys a "Mediterranean" climate in common with Greece and the southern valleys. The north and east, exposed to cold north-east winds, experience "continental" extremes. In summer the heated Danubian plains draw towards the Balkans and the Servian heights water-bearing winds from the Black Sea, bringing summer rains which clothe the mountains with forests and promote maize-growing in the plains and valleys.

214. **Products.**—The pastoral limestone west produces mainly wool; but Adriatic valleys yield olives, oranges, lemons and figs. In the north and centre—

¹ Originally an Austrian name for the Istrian plateau.

especially in Servia—enormous herds of swine feed in the forests on oak and beech “mast.” Northern valleys produce—besides maize—tobacco and fruit, particularly plums, and bear large vineyards and mulberry plantations; while the sugar-beet is increasingly grown. Typical Mediterranean products [176] characterise southern valleys, where roses are largely grown. Sheep

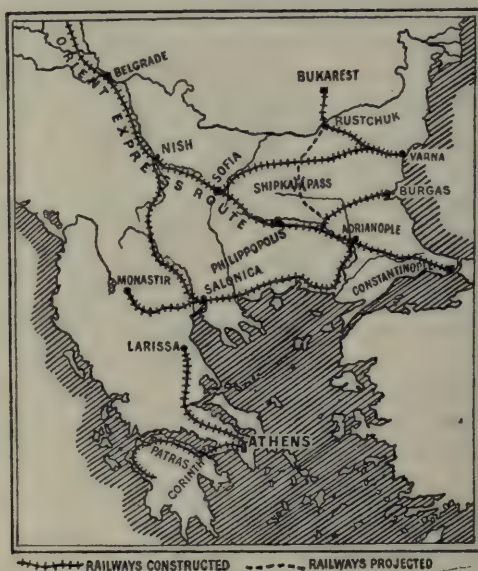


FIG. 40.—CHIEF BALKAN RAILWAYS.

and goats, grazing everywhere on the heights, yield wool. The central highlands are rich in iron, silver-lead and other minerals, all practically untouched through bad government and the difficulty of transport.

215. Communications.—Roads everywhere are few and bad, the difficulty of the country hindering both road and railway construction. The Morava,

Vardar and Maritza valleys, however, have facilitated the construction of important railways connecting Belgrade with Salonica and Constantinople [Fig. 40], the latter being the route followed by the Orient Express from Paris to Constantinople. Beyond the lines shown in the Figure railways are few and unimportant, and few extensions are even contemplated. Only the Maritza and the **Danube** are navigable. By the latter steamers may reach Ratisbon, and smaller craft Ulm, in Bavaria, whence, by a connecting canal, the Rhine and the North Sea may be reached. The lower Danube is controlled by an International Commission to secure its neutrality and preserve and improve its navigation. The middle deltaic channel now admits large steamers. The rapids at the Iron Gate were surmounted by locks in 1896.

216. A 26-foot **ship-canal** four miles long pierces the Isthmus of Corinth, but, although offering an advantage over the dangerous rocky southern passage between eastern and western Greece, it is less used than was expected because of its narrowness (100 ft.) and the strength of the current sometimes flowing through it.

217. **Ports.** — The southern coasts and fringing islands are mostly well adapted for small shipping; but, except for Athens and Constantinople, there are few natural harbours. The Black Sea coast is unbroken.

BOSNIA AND HERZEGOVINA

Area, 19,768 square miles ($=\frac{2}{3}$ Ireland); population, 1910, 1,898,044 ($=\frac{2}{3}$ Ireland).

218. These provinces now belong to Austria-Hungary. **Agriculture**, though still backward, has greatly improved under State encouragement. **Timber** is the chief export, other important items being dried plums,

tobacco and skins. Most of the trade is with Austria-Hungary.

MONTENEGRO

Area, 5,600 square miles ($=\frac{1}{3}$ Ireland); population, 500,000 ($=1\frac{1}{4}$ times Belfast); both estimated.

219. This small state is almost entirely “karst” land [212] whose difficulty alone has enabled her to maintain her independence. **Pasturage** and **fishing** are the main occupations. The small trade is chiefly with Austria-Hungary and Britain, the exports being almost entirely animals, hides, skins and wool. Practically everything required is imported—except food. The country uses the Austro-Hungarian port of Cattaro, with which Cetinje, the capital, is connected by a good road.

ALBANIA

Area, about 11,000 square miles ($=\frac{1}{3}$ Ireland); population, about 1,000,000 ($=\frac{3}{8}$ Ireland).

220. Albania, which secured independence from Turkey in the war of 1912-13, is also largely karst land with occasional sheltered valleys in which grain and fruits are raised. Skutari, on the lake of that name, is the capital, and Dulcigno, on the Adriatic, the only port worth mention.

SERVIA

Area, about 34,000 square miles ($=\frac{2}{3}$ England); population, about 4,548,000 ($=\frac{1}{8}$ England).

221. Servia is practically a mass of forest-clad mountains with extremely fertile river valleys opening to the Danube. The rich maize-crop emphasizes the importance of swine-rearing [68]. Coal and iron are worked, and cask-staves exported. Industries, actively encouraged by government, are practically con-

fined to the capital, Belgrade. The chief are cotton, silk and carpet weaving, all still largely *domestic*; others are flour-milling, brewing and distilling, sugar-refining, tanning and boot-making.

222. Only two Servian towns are important. **Belgrade** (90,890) grew at the junction of two navigable rivers, and now derives additional importance from its situation on the great International railway. The intersection of the highways and the command of the rich Morava valley make it an ideal centre for the conduct of the external trade, most of which is with Austria-Hungary. **Nish**, though small, is an important railway junction. **Exports** include wheat, maize, barley, animals (especially swine) and their products, prunes and other fruits. The chief **imports** are textiles, metal wares and machinery, and hides.

BULGARIA

Area, estimated, 43,300 square miles ($=1\frac{1}{3}$ times Ireland); population, about 4,467,000 (=Ireland).

223. The more exposed country north of the Balkans, and the low-lying south-eastern plain acquired from Turkey in 1913 and bordering upon the Turkish frontier, are mainly grain-land and pasture; while Eastern Rumelia, in the shelter of the Balkans, yields notably tobacco and roses. The latter grow profusely along the southern Balkan slopes round the Shipka ("Wild Rose") Pass. Cotton and rice are other Rumelian products. Coal and stone are the only minerals appreciably worked.

224. The great progress made by the country since it threw off Turkish rule in 1878 is the best evidence of the blighting effect of that rule upon Turkish dominions. Manufactures now prosper, excelling those of Servia in

quality. The chief industries produce woollen goods, carpets, leather goods, attar of roses and cigarettes.

225. **Sofia** (102,812), the capital, on the Orient Express line, commands by rail both northern and southern plains; while **Philippopolis** (47,981) commands the upper Maritza valley and the line to **Burgas**, where a new harbour was opened in 1903. **Rustchuk**, an important Danube grain port, supplies **Varna** by rail with enormous grain shipments.

226. **Exports** include wheat, maize, animals and their products, flour, woollen goods (including carpets), tobacco and attar of roses; the chief **imports** being textile goods, iron and iron goods, sugar, wood, petroleum, coal and paper. Most of the trade is with Turkey, while Austria-Hungary, Germany and the United Kingdom follow in the order named.

TURKEY

Area, 8,644 square miles ($=\frac{2}{7}$ Scotland); population, about 1,590,000 ($=\frac{1}{3}$ Scotland).

227. Turkey was formerly long for its breadth, a fact which alone would make government from a single centre difficult without efficient communications; and the mountainous character of most of the country accentuated the difficulty. Turkey is now, however, the smallest Balkan state except Montenegro, and, being exposed to cold Black Sea winds, has an almost continental climate [8]. **Agriculture**, the main occupation, is most backward, the rich plains being largely unproductive, although much grain is grown even under present conditions. Coastal **fisheries**, although conducted on antiquated lines, yield a rich return.

228. Bad government, excessive taxation and the lack of roads and railways militate against development,

and industries are few. Cotton, wool and silk are manufactured at Constantinople, and Adrianople manufactures silk, attar of roses, "morocco" leather and carpets. Primitive domestic industries also exist.

229. Few towns or ports deserve special mention. **Constantinople** (1,200,000), with a splendid natural harbour in the Golden Horn, enjoys a unique position, commanding trade between the Black Sea and the Mediterranean as well as that between Europe and Asia *via* Skutari. With the development of the Turkish Empire it would assume supreme importance. Industrial **Adrianople** (83,000), a river and railway junction in the middle of a fertile plain, would share largely in the prosperity which an improvement in Turkish conditions would bring.

230. It is characteristic of Turkish temperament that satisfactory statistics are not obtainable, and that the trade is mainly conducted by English, French and Belgian merchants. **Exports** include barley, tobacco, scent, silk, figs, raisins, olive oil, cotton and carpets; while the **imports** include textile fabrics, flour, rice, sugar and petroleum.

231. **The Future.**—The rugged, mountainous character of most of the Peninsula has prevented the unification of its peoples, and its commanding strategic position renders it a "buffer" region. The periodic recurrence of strife is therefore a matter of grave anxiety to the Great Powers, which cannot tolerate individual interference by a single power possibly leading to the acquisition of a predominating influence. It is possible that the war of 1912-13, in giving Albania the independence she craved, has removed at least one fruitful source of trouble, and therefore somewhat relieved the situation. The main hope of Balkan

countries lies in their peaceful development, and the better government of Turkey itself would go far towards securing it and eliminating a chronic cause of anxiety.

GREECE

Area, approximately 41,933 square miles ($=\frac{1}{3}$ Britain) ; population, approximately 4,363,000 (= Ireland).

232. Greece is mostly a mass of mountains with many fertile valleys sufficiently near each other for intercourse, but sufficiently isolated to promote independence and rivalry and prevent the growth of a strong national sentiment. Though agriculture is backward the soil is unusually rich, and **cultivation** and **maritime trade** engage most of the people. The peninsular climate is essentially "Mediterranean," the main products being of the usual type [176]. A small seedless grape, when dried, forms the "currant" of commerce. French demand for wine-production, when the vineyards of that country had been ruined by the ravages of the phylloxera, led to the cutting-down of many fine old olive-groves to accommodate currant production which is now, owing to the revival of the French vineyards, greatly in excess of the demand. The eastern part of the territory taken from Turkey in 1913 shares the exposed, continental climate of that country, mountain slopes furnishing wool and skins, and sheltered valleys silk, cotton, fruits, tobacco and roses.

233. The marshy Lake Copais was recently drained, fitting over 50,000 acres of exceptionally rich virgin soil for agriculture. This is important to a country compelled to import two-thirds of its grain-requirements. **Minerals** are more extensively worked than in any other part of the Peninsula, lead, iron and zinc being the chief; while the occurrence of both coal and iron near

Salonica points to industrial possibilities at that port, where cotton, wool and silk are already fairly important manufactures.

234. Possessing no wood, coal,¹ water-power, proper communications or capital, Greece has undergone little industrial development. The few **industries**, apart from those of Salonica, are practically monopolised by **Athens** (167,479) and depend on British coal; textile weaving and soap-making are the chief. Patras, deriving importance from the Isthmian ship-canal [216], is the great currant port; Piræus is the port of Athens, a short line connecting the two; and Volo is the port of the rich plain of Thessaly. **Salonica** (174,000) is the terminus of an international railway *via* Belgrade [Fig. 40] offering at present the quickest route from London and western Europe to Egypt.

235. **Exports** include currants, minerals, olive oil, wines, tobacco and figs; **imports** being mainly grain, textile goods, coal and fish. Most of the trade is with Britain, the Austro-Hungarian share being rather less than half the British.

ITALY

Area, 110,550 square miles ($=\frac{11}{12}$ Britain); population, 1911, 34,671,377 ($=\frac{3}{4}$ Britain).

236. Italy derives great benefit from her exceptional **length of coast-line**, and her **intermediate position** in the Mediterranean; and her separated lowlands, unlike those of the Balkan Peninsula, have everywhere easy access to the sea. Considerable differences of climate are reflected in the products of these fertile lowlands.

237. The southern slopes of both Alps and Apennines are steep, the northern slopes of the latter being more gradual. This partly explains the greater width and

¹ Until the acquisition of Salonica in 1913.

flatness of the plain to the north of the Po, and helps, with the bending of the Apennines towards the east coast, to give the western peninsular lowlands greater width and flatness and longer rivers than the eastern. It also partly explains the extraordinary wealth of the Alpine crescent in glacier-fed water-power.

238. General deforestation [184] has rendered mountains barren and rivers scouring-agents which, with great quantities of alluvial mud, enrich the plains and extend their deltas seaward. So much mud is brought down by the Po that its channel is silted up and its banks raised until the river is often above the level of the surrounding plain,—a great aid to irrigation,—while the delta has encroached upon the Adriatic to the extent of 20 miles within historic times [174]. Deforestation has also distinctly affected the climate by the removal of the moderating influence of forest areas.

239. **Climate.**—Owing to its situation and configuration, Italy receives more rain than any other part of the Mediterranean region. The Apennines face the southwest winds from over a fair area of warm water with regular evaporation, and cause a fair rainfall which, along the shores of the Gulf of Genoa, occurs even in summer. The Po valley is naturally drier, although the same winds, after crossing the Apennines, have to ascend still higher to cross the Alps and in doing so bestow a good rainfall upon the northern valley-slopes. The moist climate of centres like Genoa, Alessandria, Milan, Como and Brescia partly explains the development of their textile industries [245].

240. The Po valley, cut off from the sea influence, experiences extremes of temperature [8]; the summer heat enables rice to be grown on irrigated land round the middle course, but the winter cold banishes the olive.

In the south-west of the peninsula and the islands the hot and dry "sirocco"¹ emphasises the natural heat. In many parts, particularly on the flat west coast and in south-eastern Sicily and south-western Sardinia, river action has formed large swamps which, where sheltered from the wind, breed malaria and are useless except as a source of salt. Drainage would fit them for agriculture (*cf.* § 233).

241. **Products and Industries.**—Rich soil, cloudless sunshine and abundant water (rain and irrigation) combine to make **agriculture**, despite backward methods, the outstanding industry; yet high rents and heavy taxation cause discontent and emigration. The higher hill-slopes yield wool, and skins for kid and morocco. The best wool comes from the Piedmontese pastures, the central Apennine slopes and particularly the limestone plateau of Apulia; while Alpine slopes supply the best skins. Cows, grazing on the luxuriant meadows of the southern Po valley-slopes, yield milk for the Gorgonzola and Parmesan cheese industries, the dry climate and plentiful grain leading to poultry-rearing and a large export of eggs and fowls. Chestnut forests in many parts feed large numbers of swine (*cf.* § 214). Much of the Po valley is covered with irrigation canals. Maize and rice thrive in the lower, hotter and moister valley, wheat predominating in drier Lombardy. Wheat is also important in Sicily, Tuscany and limestone Apulia, the last-named province producing exceptionally fine hard grain for macaroni made at Parma and Piacenza. Beans and peas are widely grown.

242. In Tuscany wheat-straw is made into hats—mainly at Leghorn and Pisa. Local flax supports linen-mills at Bologna and Ravenna, hemp similarly

¹ A hot wind occasionally blowing from the Sahara.

feeding cordage works at Cremona, Treviso and Mantua. Excellent cotton and tobacco are grown on the hot Calabrian and Sicilian coasts. The **vine** is particularly important on the drier and sunnier Apennine slopes, Italy being the second wine-producer after France; the vintages of Florence, Alessandria, Parma and Marsala enjoy a high reputation. Florence marks the northern limit of successful olive growing; the greatest production is in the south, but the finest oil is produced at Lucca. Olive waste supports soap factories at Florence, Genoa, Bari and Reggio. Figs and almonds are important southern products, and oranges, lemons and citrons thrive in Sardinia, Sicily and Calabria.

243. The most valuable cultivated product, however, is **silk**, Italy being one of the largest sources [124]. Quite three-fourths of the output comes from the upper Po mulberry groves, Lombardy producing the most and Piedmont the finest. Milan and Como lead in silk-manufacture. There are large sardine and tunny fisheries off the west coast and in the Gulf of Taranto, coral and sponges being also obtained.

244. **Sulphur** is much the most important mineral product, mainly in the south and east of Sicily, and particularly at Girgenti. The finest **marbles** are obtained at Carrara, Massa and Brescia. **Iron** is found in Sardinia and Elba, the finer Elban ore supporting—with British coal—ship-building industries at Sestri, Spezia and Genoa, machine-works at Savona, Voltri and Genoa, and steel rail and locomotive works at Genoa, where also imported scrap-iron is now largely re-smelted. The poorer iron-ore of north Lombardy supports the cutlery industry of Milan. Large steel-works at Terni, in the Tiber valley, utilise both water-power and local lignite.

Iron industries are encouraged by the state. Sardinia produces zinc and lead; silica, found at Murano, supports the ancient Venetian glass industry; while boracic acid is obtained near Florence as a vapour ascending from the soil, and as a deposit on the island of Volcano. Beyond a few petroleum wells in the Emilian Apennines and a few unimportant deposits of lignite, Italy possesses no fuel.

245. Forest-exhaustion and the want of coal have hindered industrial development, and most existing industries are more or less artistic. Lately, however, **textile industries** consuming home-produced fibres, imported cotton and British coal have been growing steadily where the climate is sufficiently moist [239]; and the increasing use of water-power [43] has provided a substantial impetus.¹ Pastures support woollen mills at Turin, Biella, Lucca and Florence, convenient cotton imports supplying the mills of Genoa, Alessandria and Piacenza. Other rising textile centres are Brescia, Pinerolo, Novara and Varillo. Majolica² and other wares are made from local "earths" at Faenza, Naples and Florence, and mosaics at Florence, Venice and Rome. Coral jewellery is made at Naples, Leghorn and Brindisi, and violin strings at Naples.

246. The chief **towns** of the Po valley mostly form lines marking the former edges of the flood-plain. On the south side an almost perfect straight-line joins Parma, Reggio, Modena, Bologna, Forli and Casena, all at the same time commanding valley routes southward. On the north side we find similarly Novara, Milan, Brescia, Verona, Vicenza and Treviso, all just

¹ The total available water-power is estimated at 3,000,000 horse-power, little over $\frac{1}{10}$ being yet harnessed.

² Derived from Majorca [260].

above the flood limit and all convenient for Alpine transit. Other towns like Pavia, Piacenza and Cremona



FIG. 41.—ITALY: CHIEF RAILWAYS.

grew where the river might be bridged. Ferrara commands the deltaic channels.

247. **Milan** (599,200), with abundant water-power specialises in silk. It commands the centre of the

plain and the St. Gothard and Simplon Alpine routes [Fig. 41]. **Turin** (427,106), at the head of the Po navigation, commands the upper plain and the Mont Cenis route, and specialises in wool. The international importance of the Alpine routes lends peculiar prominence to both cities. **Florence** (232,860) stands at the head of the rich Arno valley, at the limit of navigation of the river, where a route over the Apennines to Bologna is the main highway from the Po valley with its Alpine connections to western Italy. **Rome** (542,123), the capital, grew sufficiently far up the navigable Tiber to be safe from pirates, and is important mainly because fairly central.

248. **Communications.**—Besides the routes already named the Brenner Pass offers easy connection with Germany *via* Innsbruck. The Po is navigable for steamers to Valenza, and small craft to Turin. The Ticino and Adda may be ascended to their lake sources, and the Adige into the Austrian Tyrol.

249. **Ports.**—**Venice** (160,719), with a large, deep harbour, until lately the chief port, serves the lower Po valley and commands an easy route to Austria. **Ancona**, the best Adriatic harbour after Venice, does a special trade in asphalt. **Brindisi** is the terminus of the overland mail and passenger route to the Suez Canal (*cf.* Salonica, § 229). **Taranto**, with a fine harbour, is a rising wool and wheat port. **Palermo** (341,088) trades largely in wine and fruit; but its good harbour unfortunately requires constant dredging. **Messina** commands both cross-channel and through-channel traffic.

250. **Naples** (678,031), the largest town and second port, stands on a magnificent bay with a large, deep harbour. Its hinterland, a rich, volcanic, populous

fruit-growing plain, would become important if developed. **Cagliari**, the chief port of Sardinia, has a large export of minerals and salt : **Leghorn** is the chief Tuscan port ; **Civita Vecchia**, the port of the capital, has an

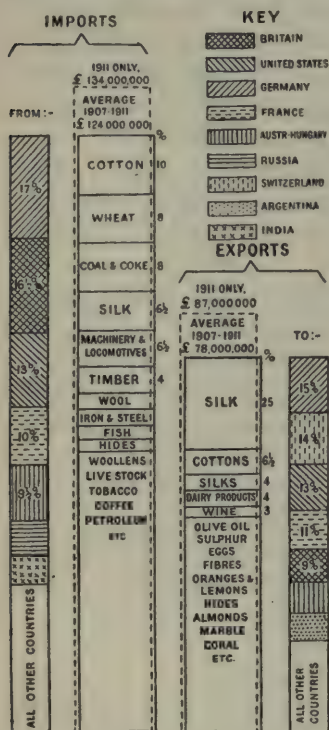


FIG. 42.—ITALY: FOREIGN TRADE.

requires a large import. Animal imports include cattle for fattening and Swiss milk-cows for milk-production.² Forest-exhaustion explains the rapidly-increasing im-

ports of minerals and salt : **Leghorn** is the chief Tuscan port ; **Civita Vecchia**, the port of the capital, has an artificial harbour in much need of improvement ; and **Spezia**, an important naval station, suffers from lack of good communication inland. **Genoa** (272,221), now the chief port, with a fine harbour, is connected by two railway lines with the plain of Lombardy, of which it is the natural port, and receives considerable trans-Alpine trade *via* Turin and Milan. **Savona**, communicating with Piedmont over the low Col dell'Altare,¹ shares the Turin trans-Alpine traffic.

251. Foreign Trade.—

Although a large wheat-grower [Fig. 10], Italy has to import one-third more than she grows [Fig. 42]; and, despite her large fisheries, the demand re-

¹ A low pass between the Alps and the Apennines 1,600 feet above sea-level.

² Swiss cows yield better milk in greater quantity than Italian.

port of timber. The silk-export has already been discussed [124]. Italy is the chief source of sulphur, and the third of both wine and rice.

252. Britain imports from Italy chiefly fruit, hides, hemp, chemicals and dye-stuffs, while she supplies Italy chiefly with coal, machinery, iron goods, textiles and chemicals.

MALTA

Area, 118 square miles ; population, 1911, 228,534.

253. The importance of Malta, commanding the narrow passage from the western to the eastern Mediterranean, is mainly **strategic**. It is also an important naval repairing-station, and a port of call and **coaling-station** for merchant vessels. Agriculture is the main occupation, most Mediterranean products [176] being raised with early potatoes and vegetables for export. Some cotton is manufactured. The chief **imports** are coal, wheat, beer, wines and spirits, bullocks, cotton goods, sugar, and iron and steel goods. Almost half of the total trade is with Britain.

SPAIN AND PORTUGAL

Area, 194,783 square miles ($=1\frac{1}{2}$ times Britain) ; population, 1910, 19,588,688 ($=\frac{1}{3}$ Britain).

Area, 35,490 square miles ($=1\frac{1}{10}$ times Ireland) ; population, 1911, 5,957,985 ($=1\frac{1}{2}$ times Ireland).

254. The Iberian Peninsula, approximately square, is mainly an elevated **table-land** crossed by parallel mountain ranges trending from south-west to north-east. The table-land, descending abruptly to the coast except towards the Atlantic, consists mainly of the plateaux of Old and New Castile, separated by the Sierra de Guadarrama and drained respectively by the Douro and the Tagus ; while the chief lowlands are the lower valleys of the Ebro, Guadalquivir, Tagus and Douro.

The narrow Mediterranean coastal plain is exceptionally rich and productive; and behind the even narrower Biscay coastal plain lies great mineral wealth [260].

255. While the north-west receives rain throughout the year from the Anti-Trades, most of Portugal, owing to the latitude, receives only winter rains [170]. The north-western mountains keep the plateau of Old Castile very dry, and elsewhere the direction of the ranges allows the winter Anti-Trades to pass over most of the interior without depositing an appreciable rainfall, the condensation occurring mainly in sudden and irregular downpours on the eastern mountains, where, consequently, most rivers rise. General **deforestation** has made the rivers scouring-agents [184], eating so deeply into their channels that they are not only, generally speaking, useless for irrigation on the plateaux but a serious obstacle to railway construction. Except for the Ebro, Mediterranean rivers are short and rapid; useless for navigation, but rich in water-power which may some day be utilised (*cf.* Italy, § 245).

256. The **interior**, mainly cut off from the oceanic influence, suffers extremes of temperature; the winter cold, emphasised by the altitude, provides abundant skating, while the summer heat renders the land desert except where irrigation is possible, as on the plateau of Old Castile (the "granary of Castile") where much wheat is grown, and flour-milling is important at Valladolid, Zamora and other towns. The lower Guadiana and Guadalquivir valleys are extremely hot in summer, being exposed to Saharan winds (*cf.* § 240).

257. Development is hindered by high taxation and inadequate communications. **Agriculture** is the main industry, engaging more than half the population; and great variety of production reflects the variety of

climates. Wheat is important both in Old Castile and Portugal. Heavy maize¹ and rye crops are raised in the moist north-west, the former being also productive on hot, irrigated Mediterranean lands. Barley is prominent for cattle-food. **Oak-forests** in Portugal and on the Catalonian slopes furnish bark from which cork is cut at Beja, Portalegre, Cadiz and Gerona; and in Portugal large herds of swine feed on the acorns.

258. The Mediterranean coastal plains raise typical products [176]. No land in the world is more productive than these "huertas," which are elaborately irrigated and manured. **Fruits** are the chief product, but the heat enables rice, sugar-cane, and even the date-palm to be grown. The mulberry thrives, but silk production is but one-tenth of its former volume. The Balearic Isles grow the usual Mediterranean products.

259. Onions, garlic and chick-peas (a staple peasant food) are ubiquitous; esparto grass—for paper—is characteristic of dry, un-irrigated parts. Tobacco, a government monopoly, is manufactured mainly at Seville and Madrid; but large imports are necessary. In the moist north-west cattle are raised for export; the grazing elsewhere, mostly poor, supports many sheep [Fig. 23], mainly inferior breeds. Bulls for the national sport and fine Arab horses are reared on the rich, warm grazings of Andalusia. There are important sardine, tunny-fish and cod **fisheries**, particularly off the Atlantic and Catalonian coasts; yet large imports are required (*cf.* Italy, § 251). Lobsters are caught on the coast of Asturias.

260. The great **mineral wealth** is mostly exploited by foreign capital for export in the absence of home industrial development. The finest **iron** ore is found,

¹ An important peasant food.

with plentiful coal, in the Cantabrian mountains; yet pig-iron is imported for use in the coastal industries, Bilbao specialising in ship-building. Much ore is exported to the iron-works of Britain and other countries. The **copper** of Rio Tinto¹ and Tharsis, the **quicksilver** of Almaden and the **lead** of Linares are famed, the mines being among the most productive in the world. **Silver** is commonly found associated with lead. **Tin** and **zinc** are important in Galicia, the former supporting the sardine-canning industry of Coruña; and **coal** is chiefly found near Oviedo, Leon, Cordova, Valencia and Barcelona. Setubal and Cardona both produce salt, that of Setubal being considered the finest in the world. Suitable "earths" explain the manufacture of glass and fine earthenware in New Castile (near Madrid) and Majorca.² Portugal, though rich in other minerals, has no coal, the want of which combines with the lack of transport to prevent them from being worked.

261. After agriculture the most important industry is **wine-making**, the vintages of Oporto, Jerez, Malaga, Alicante and Tarragona being noted. Olive-oil is produced mainly at Cordova, Lisbon and Valencia, Spain producing and consuming more than any other country. Barcelona and neighbouring towns manufacture cotton and linen, having accessible coal, a sufficiently moist climate, and convenient imports of raw material (*cf.* Genoa, § 245). Cotton is also manufactured at Lisbon and Oporto. Valencia and Seville have silk industries, and Salamanca and Ciudad Real manufacture wool. **Madrid** (571,539), the capital, with important chocolate and gold and silver industries, owes its

¹ Exported from Huelva, whose otherwise excellent harbour has a troublesome bar.

² Whence "Majolica" ware.

importance mainly to its central position (*cf.* Rome, § 247). Toledo is famed for guns, swords and cutlery.

262. **Communications** in the interior are greatly hindered, not only by river channels [255], but by cross-country mountain ranges; and access from the productive and populous coastal plains is difficult



FIG. 43.—SPAIN: RELIEF AND RAILWAYS.

except in the west. The only two **railways** from France pass through tunnels at either end of the Pyrenees [Fig. 43]. Madrid, the focus of the system, is directly connected with Lisbon, its natural port. Three other lines are either projected or being constructed across the Pyrenees, and 10,000 miles of new railways have been authorised; but meantime train services continue to be slow, inadequate and expensive.

263. The Douro takes boats to the Portuguese frontier, and small steamers reach Oporto; but a dangerous bar at the mouth has necessitated the outport of Leixoes. The Tagus is navigable almost to the frontier, and **Lisbon** (435,359), the chief port, with a splendid harbour, is accessible to the largest steamers. **Seville** (155,366), on the Guadalquivir, with a large fruit export, is reached by sea-going

steamers; but constant dredging is necessary, and extensive improvement works are in progress to minimise risk of damage by floods. The extension of irrigation is increasing the value of its hinterland. The Ebro is navigable for steamers to Tortosa.

264. Many ports suffer from silting by persistent currents [175]. On the north coast an eastward-flowing current necessitates constant and expensive

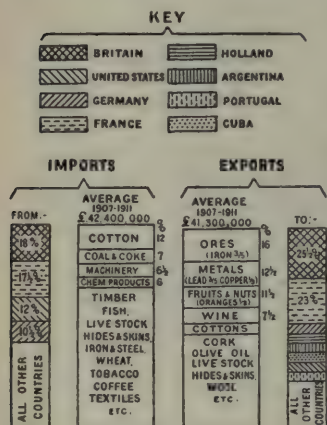


FIG. 44.—SPAIN: FOREIGN TRADE.

expensive dredging at **Bilbao** (92,514). **Coruña** and **Vigo**, with excellent harbours, have a large fish trade, while **Oporto** (194,009) chiefly handles wine. **Cadiz**, a good roadstead, is declining with the development of **Seville**. **Malaga** (133,045), with a fine harbour, has a large trade in fruit, wine, zinc and lead. **Almeria**, **Alicante** and **Cartagena** also export fruit and wine. **Valencia** (233,348), the chief port of that province, handles silk and olive-oil. **Barcelona** (560,000), with a splendid harbour, serves the plain of **Aragon**.

265. The **foreign trade** of Spain is shown in Fig. 44. Portugal imports mainly wheat, cotton, iron and iron manufactures, textile goods, coal, fish, machinery and sugar; while she exports chiefly wine (one-third of the total value), cork, cotton goods, sardines, fruits and timber. More than one-fourth of her total trade is with Britain.

THE AFRICAN SHORES

266. The low eastern shores, practically a continuation of the great Saharan desert, are mainly unproductive. In the west the Atlas Mountains run from south-west to north-east, where Cape Bon projects within ninety miles of Sicily. Between them and the coast runs the "Little Atlas," converging towards the Atlas proper at either end and enclosing a wide plateau rising towards the east and dotted with salt lakes or "shots." The fertile Mediterranean slopes with their occasional rich river-valleys are known collectively as the "Tell."

267. **Irrigation is generally necessary.** Grain, beans and cattle are characteristic of the better-watered Atlantic valleys of Morocco, olives, fruits and wine prevailing in the drier Algerian and Tunisian "Tell." Heights everywhere support sheep and goats, as does also the plateau of the "shots," which grows enormous quantities of "alfa" (esparto grass) and supplies unlimited salt. South of the Atlas the Sahara, dotted with date-growing oases, is crossed by camel-caravan trade-routes [Fig. 78] along which come dates, ostrich feathers, ivory, gold-dust and hides to northern ports.

MOROCCO

Area, about 219,000 square miles ($=1\frac{1}{8}$ times France); population, about 5,000,000 ($=\frac{1}{3}$ France).

268. Morocco became, in 1911, a French protectorate. The hindrance to development offered by a

fanatical, semi-barbarous rule under which neither life nor property was secure, had long been accentuated by international jealousies; but now, under the sole care of France, the country should develop. The soil is rich; mineral wealth is great; but cultivation is limited to rain-watered inland plains and valleys, and minerals are practically untouched. The country is, in fact, still largely unexplored, and mule or camel tracks serve where railways and roads might exist. The chief towns lie amid inland grain-fields, like Mekinez and Morocco, or on the coast, like Tangier and Mogador.

269. Practically the only surviving industries are leather and rug-making, centred at Fez; flourishing silk, woollen and embroidery industries have disappeared. **Exports** include hides, skins and leather, animals, eggs, wheat and barley, wool, almonds, linseed and beans; the chief **imports** being textile goods, sugar, hardware, candles and petroleum. Two-fifths of the entire trade is with France, and one-fourth (mainly manufactured imports) with Britain. Casablanca handles most trade, Tangier being the second port and Mogador the third, followed by Mazagan, Laraiche and Saffi. A considerable trans-Saharan trade exists with Timbuktu [461].

270. Natural wealth renders the country a promising field for French enterprise, and, with road and railway construction and the utilisation of rivers for navigation and irrigation, a prosperous future seems assured.

ALGERIA¹ AND TUNISIA²

271. Algeria is the most important French colony. Tunisia, formerly a Turkish province, has been a French

¹ Area, 184,474 square miles ($=\frac{9}{10}$ France); population, 1906, 5,231,850 ($=\frac{1}{8}$ France). ² Area, about 50,000 square miles ($=\frac{1}{4}$ France); population, 1910, about 1,923,217 ($=\frac{1}{20}$ France).

protectorate since 1881, excellent roads and railways having been made and harbours constructed, and the resources of the country largely developed.

272. **Products.**—The “Tell” yields all varieties of Mediterranean produce, and, by river and artesian-well irrigation, wheat, barley, early potatoes and vegetables for French markets. The Mejerda valley in Tunis is exceptionally productive, being periodically covered with rich mud by the river (*cf.* the Nile, § 279). Mejerda olives yield some of the finest oil in the world. Wine

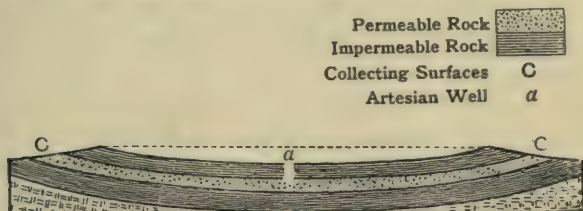


FIG. 45.—ARTESIAN WELL.

is increasingly important in both countries, Algeria being already one of the chief producers.¹

273. **Artesian wells** are sunk through an impervious stratum, *e.g.*, clay, to an underlying bed of water, whence a supply is forced to the surface by underground pressure [Fig. 45]. Water so tapped is generally accumulated by the filtration of rain from where the strata “outcrop,” their downward slope enabling water at higher levels to press upon that at the lower and force it to rise through the “bore.” But sometimes the water is *plutonic*, *i.e.*, derived not from current rain-supplies but from rocks formed at a remote period; and pressure is then probably derived either from the weight of overlying rocks or from subterranean gases.

¹ Coming fourth, after France, Italy and Spain.

Such supplies, naturally limited, become exhausted in time. Some artesian waters, containing salts injurious to plant life, are useless for irrigation.

274. The Atlas slopes bear large forests of cork-oak, and of a variety yielding excellent tanning-bark. Wool is important; and it is said that practically all the world's paper might be manufactured from "**alfa**" **grass** that merely requires gathering on the plateau. There are important sardine and tunny fisheries, and the shallow Gulf of Gabes yields excellent sponges. Enormous phosphate rock deposits on the Tunisian plateau round Gafsa yield an important and rapidly-increasing export (for manure). The great **mineral wealth** of both countries is capable of much further development. Iron is obtained at Benisaf and near Bona, and lead, zinc and copper are mined. Petroleum has been found near Oran.

275. The absence of coal naturally restricts industrial development, and, unlike Spain and Italy, these countries have no great reserve of water-power; yet flour and oil mills thrive in most towns, and cork-cutting is widely distributed. Soap is made at Constantine and elsewhere from olive waste, and morocco chiefly at Busada; while carpet-weaving is still important in Tunisia. Sardines are canned at eastern Tunisian ports. **Biskra**, the great date market with converging desert routes, is now connected with the railway system [Fig. 78], as is also the western oasis of Figig. At Kairwan alfa is gathered and packed. **Constantine** (65,173) is an important railway junction.

276. **Algiers** (172,397), with its splendid, large artificial harbour and extensive dock and storage accommodation, is one of the chief Mediterranean ports and coaling-stations, convenient for the direct sea route

from London to the Suez Canal; **Oran** (123,086), the second port, handles grain, alfa grass and tanning-bark; Benisaf manufactures and exports iron; and Mostaganem, though a mere roadstead, has a large general trade. Bougie, Philippeville and Bona are other ports. **Tunis** (277,000), now accessible by ship-canal, has become strategically important, dominating the strait between Cape Bon and Sicily. Bizerta exports cork and general produce, and Susa and Sfax handle alfa, cork, fish and sponges, Sfax also exporting phosphate.

277. Foreign Trade.—**Algerian exports** include wine, wheat, barley, sheep and wool, flax, early potatoes and vegetables, fruit, tobacco, olive-oil, alfa, iron, morocco, dates and cork. **Tunis exports** mainly olive-oil, phosphates, sponges and wine. **Both countries import** mainly manufactured goods and coal (from the United Kingdom), Tunisia importing also grain, flour and sugar. The Algerian trade is mainly with France, most of the Tunisian trade being divided between France and Algeria; Italy and the United Kingdom follow with an equal share.

TRIPOLI

Area, about 406,000 square miles ($=3\frac{1}{2}$ times Italy); population 1911, 529,000 (= Rome).

278. Tripoli, a Turkish province annexed by Italy early in 1912, is largely desert with occasional oases producing grain, fruits and dates, and is chiefly important as possessing the most accessible coast for the best desert routes from the Sudan [Fig. 78]. Ivory, gold dust, ostrich feathers and dates are brought to Tripoli and Benghazi, the only ports, for export, and there exchanged for manufactured goods from Europe, imported—mainly from the United Kingdom—for the

purpose. Alfa grass covers the shore wastes, and sponges are obtained; both are exported, with barley and eggs from the oases. Tripoli has a good harbour.

EGYPT¹ AND THE EGYPTIAN SUDAN²

279. Egypt is practically a mere **streak of fertility** in the desert covering less than one-thirtieth of the actual area. This streak, watered by the Nile, is nowhere wider than twelve miles and in parts quite narrow, its width being determined by cliffs above which the desert holds sway. Doubtless it is a "rift valley" [182]. The soil, deposited entirely by the Nile, is still re-fertilised annually by the river. Every summer melting Abyssinian snows assist the heavy rains to wash vast quantities of volcanic soil from the heights into the rivers rising there, and the Nile, receiving their muddy floods, rises with great regularity, overflowing the whole valley between the bounding cliffs and covering it with a thick deposit of rich mud. A great dam at Aswan and "barrages," *e.g.*, at Siut and across the deltaic channels below Cairo, now maintain sufficient water in the river to provide irrigation throughout the year. All Lower Egypt (the deltaic region) enjoys this "perennial" irrigation, and the rest of the valley, at present mainly dependent on the annual flooding and dry during the rest of the year, is being furnished with "perennial" canals.³ Lands so irrigated frequently yield three crops during the year.

280. **Products.**—Egypt, extending southward to Wadi Halfa (22°), lies mainly outside of the tropics.

¹ Area, about 400,000 square miles ($=3\frac{1}{3}$ times Britain); population, about 11,000,000 ($=\frac{1}{4}$ Britain). ² Area, about 985,000 square miles ($=8$ times Britain); population, about 3,000,000 ($=\frac{1}{10}$ Britain).

³ As opposed to "inundation" canals, which receive only surplus water at flood-time.

The damp soil and warm, dry air adapt it specially for the growing of cotton, sugar-cane, maize and rice ; and, although agriculture is still primitive, exceptionally heavy crops of all kinds enable the 12,000 square miles of cultivated valley to support a population of over 11,000,000. Cotton, maize and rice predominate in Lower Egypt, and sugar, millet and onions in the greater heat of Upper Egypt ; while wheat, barley, beans and lucerne thrive in all parts. Melons and fruits of every kind abound, including the orange, the fig and the date, the last-named being the staple fruit. The olive is grown on the delta and in the oases. There being no forests, wood is imported for building purposes and fuel. Grazing land is naturally scarce, and sheep and cattle are imported for food. Grain being abundant, poultry and pigeons are reared and eggs exported. There are valuable sea and fresh-water fisheries, and excellent sponges are obtained.

281. Granite and building stones abound, but salt is the chief mineral product. There are considerable iron deposits in the desert, but no coal ; it is therefore claimed that the prosperity of the country must continue to be agricultural, and that industries can never thrive. But the recently-erected **sun-ray power-plant** [45] may prove commercially successful, and, in a land so sunny, this would open up great industrial possibilities.

282. The chief industry, sugar-refining, is confined to sugar-growing Upper Egypt. Flour-milling, cotton-seed-crushing (for oil), leather-tanning and soap-making are carried on, and there are now a few cotton-factories at **Alexandria** (332,246) and **Cairo** (654,476), the chief industrial centres. Domestic industries include textile-weaving, metal-working, and the making of pottery and ornamental wood-work.

283. **Foreign Trade.**—Both exports and imports [Fig. 46] have doubled in value within the last ten years.¹ Britain takes from Egypt mainly cotton, seeds, sugar and beans, and supplies her mainly with cotton goods, coal, iron and machinery. Egypt is one of the great cotton-exporters [Fig. 19].

284. **The Egyptian Sudan,** in the north, partakes of the desert character of Egypt, and there is a gradual transition to the southern rainy region. The hills are

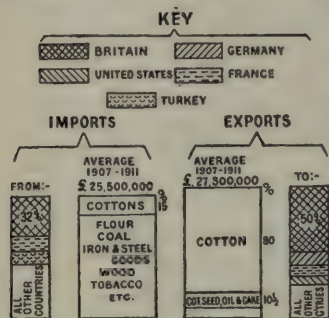


FIG. 46.—EGYPT: FOREIGN TRADE.

forest-clad, and there are rich plains and luxuriant pastures. The forest wealth in gums and rubber, as well as ebony and other valuable timbers, is at present useless through lack of transport facilities. Ivory, hides, ostrich feathers and dates are important, and cotton, wheat, maize and sesame are grown. Cotton-grow-

ing, in particular, is of great importance [108], vast promising areas bordering the upper Nile. The natives work iron, extensively found in the uplands between Nile and Congo sources; and cattle-rearing is general. The chief **imports** are cotton goods, sugar, tobacco, spirits, grain and flour, iron goods, provisions and petroleum.

285. **Communications, Towns and Ports.**—The Nile, the longest African river, is navigable to Aswan, and from Khartum to Gondokoro. Between Aswan and Khartum occur six cataracts, the first now surmounted

¹ The sugar export alone has shown a notable decline, having fallen 90 per cent. in ten years.

by a lock at Aswan extending the navigation to Wadi Halfa, where the Sudan Railway begins [Fig. 78]. Above its junction with the Sobat the river is often obstructed during the rainy season by accumulations of floating weeds—known as the “Sudd”¹—which are expensively removed by Government steamers. The Bahr-el-Ghazal is navigable for some distance, as are the Blue Nile and the Sobat when in flood. On the lower Nile navigation is assisted by the down-flowing current and the “Etesian” winds which regularly blow up-stream in summer [11]. Many irrigation canals are also navigable.

286. Camel-caravan routes connect oases in all directions. One connects Kosseir, on the Red Sea, with Kena, on the Nile, where the desert is narrowest and is crossed by a “wadi” in which wells occur. **Alexandria**, the chief port, handles nine-tenths of the foreign trade; **Rosetta** and **Damietta** are secondary ports. **Berber** is an important junction, and **Khartum**,² rapidly growing as a modern city, will prosper with Sudan development.

287. The 87-mile **Suez Canal**, taking vessels drawing up to 29 feet, was opened in 1869 at a cost of £20,000,000, and reinstated the Mediterranean as the great trade route between Europe and the East [180]. **Port Said** and **Suez** mark respectively the north and south entrances. Almost 5,000 vessels passed through it in 1911, three-fifths being British.

QUESTIONS

25. Why is the Mediterranean practically tideless?
26. Trace, on a physical map of Europe, two impor-

¹ A company was recently formed to utilise this as fuel.

² Population (with Omdurman), about 102,000.

tant natural routes—other than Alpine—referred to in § 178.

27. Cyprus is in several respects a miniature reproduction of Asia Minor. Draw a comparison between them.

28. Compare and contrast Messina with Constantinople.

29. The import trade of Genoa is much heavier than the export, the reverse being true of Venice. Why so?

30. Why is Algiers a more important port than Tripoli?

31. Why does Smyrna control the bulk of the foreign trade of Asia Minor?

32. Give reasons for the dryness of the climate of the eastern African shores of the Mediterranean.

33. The Shipka Pass railway [Fig. 40] will be commercially important. Why?

34. Explain the industries of Adrianople with reference to its command of raw material.

35. Ascertain the density of the population in Italy, Spain and Egypt. Account for the great differences shown.

36. Statistics of Italy's foreign trade show rising imports of coal, iron, machinery and wool; rising exports of textile goods; and falling exports of raw silk. What industrial tendencies do these reflect?

CHAPTER IV

CONTINENTAL ASIA

288. THE interior of Asia, the largest continent, is shut off from the influence of southern oceans by lofty mountain systems pivoted on the Pamirs [Fig. 47] and branching eastward with intervening plateaux and valleys as far as Cochin-China and Behring Strait; and it is too remote to derive benefit from the Atlantic. It has thus a very dry climate, increasingly **continental** [8] towards the east. Excessive winter cold¹ in the interior [Fig. 48] causes great density of the air, with a consequent outflow giving coastal lands their winter monsoons [Fig. 49]. In summer the interior is correspondingly hot [Fig. 50], leading to a regular inflow of moisture-laden air from the Pacific and Indian Oceans—the summer monsoons. These give coastal lands their heavy summer rains, but are prevented by mountains, as already explained, from conveying an appreciable rainfall to the interior [Fig. 51].

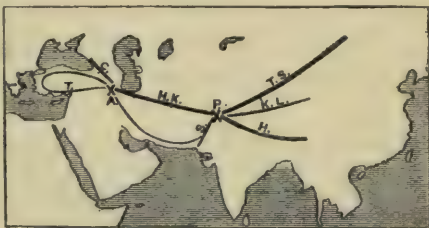


FIG. 47.—MOUNTAIN SYSTEM.

the interior [Fig. 48] causes great density of the air, with a consequent outflow giving coastal lands their winter monsoons [Fig. 49]. In summer the interior is correspondingly hot [Fig. 50], leading to a regular inflow of moisture-laden air from the Pacific and Indian Oceans—the summer monsoons. These give coastal lands their heavy summer rains, but are prevented by mountains, as already explained, from conveying an appreciable rainfall to the interior [Fig. 51].

¹ The average temperature at Verkhoyansk during the three winter months is 60° below zero—an extreme of cold unknown elsewhere.

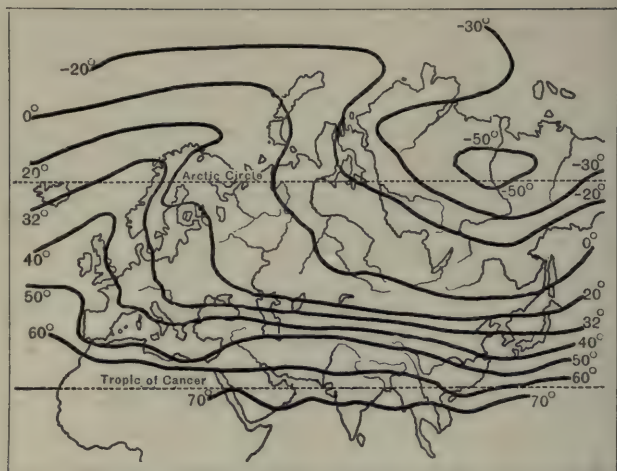


FIG. 48.—EURASIA : JANUARY ISOTHERMS REDUCED TO SEA-LEVEL.

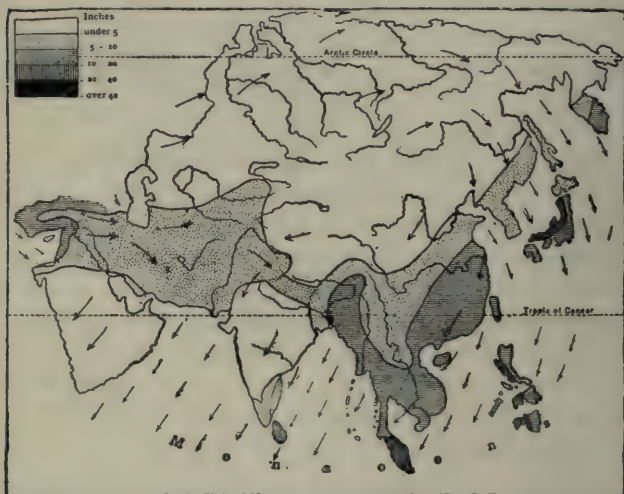


FIG. 49.—ASIA : MEAN WINTER RAINFALL, NOVEMBER TO APRIL.

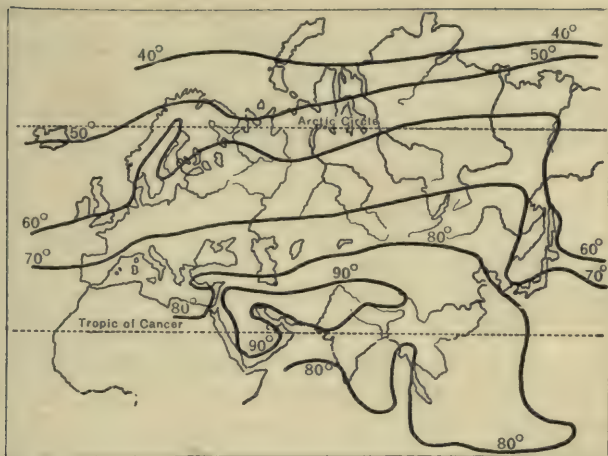


FIG. 50.—EURASIA : JULY ISOTHERMS REDUCED TO SEA-LEVEL.



FIG. 51.—ASIA : MEAN SUMMER RAINFALL, MAY TO OCTOBER.

289. Western coastal lands—Arabia, Mesopotamia and Iran—are deprived of the monsoon influence by the proximity of Africa, and also experience extremes of temperature. South-west and interior Asia are thus fitly described as “Continental Asia.”

ARABIA

Part of Asiatic Turkey. See note to Syria, p 85. Area, 170,300 square miles ($=1\frac{1}{2}$ times Britain); population, estimated, 1,050,000 (=twice Birmingham).

290. Arabia is a lofty **desert plateau** rising towards the south and sloping gradually to low-lying Mesopotamia. The descent to coastal plains is everywhere abrupt. The interior, dotted with **oases** supporting a scattered population on grain, pulses (peas and beans) and dates, is crossed by several ranges of hills nowhere high except in the centre (Nejd).

291. In the autumn the weakening summer monsoons are drawn westward by the heat of the Arabian desert; and hilly districts (*e.g.*, Yemen, Oman and Nejd) then receive for about a month a fair rainfall which is carefully preserved in tanks for irrigation. The climatic conditions of **Yemen**, whose coffee is the finest in the world, have already been described [89]. Many terraces in the same region, cut for the purpose on the seaward slopes, grow also vegetables and fruits varying in kind with the elevation. The valleys of **Nejd** raise the finest horses, donkeys and camels in the world. **Oman** lowlands are cultivated, the heights being partly forested and partly pasture-land; and the fine harbour of **Mas-kat** provides a good, if unhealthy port. The coasts elsewhere are practically desert, with here and there on the south a river valley, such as the Hadramut, productive

by irrigation and yielding the frankincense, myrrh and gums for which the coast is famed.

292. The country is politically important as dominating the Suez route to the East; but the Sinai Peninsula is controlled jointly by Britain and Egypt, and the southern strait is commanded by the British island of Perim supported by the fortified coaling-station of **Aden**. The latter has the only good harbour apart from that of Maskat, and, being a free port, has a large entrepôt trade. The Red Sea coast is fringed by a dangerous coral growth promoted by the warmth of the sea [177], and the few unimportant ports include Yambo, Jeddah, (both existing solely for traffic to the holy cities, Medina and Mecca), Hodeida and Mokha. Hodeida ships most of the Yemen coffee, formerly handled mainly by Mokha.

293. There is only one **railway** [Fig. 52], communications otherwise being by camel caravan subject to serious risk of plunder by roving Beduins. Although nominally Turkish, many oases, by their isolation, are really independent; and Oman is an independent sultanate. The pearl-fishing Bahrein Islands are under British protection.

294. **Foreign Trade.**—**Exports** include animals, wool, coffee and dates; and **imports** cotton goods, sugar and hardware. The trade is mainly with neighbouring countries and Britain.

MESOPOTAMIA

Part of Asiatic Turkey. See note to Syria, p. 85. Area, 143,250 square miles ($=1\frac{1}{2}$ times Britain); population, estimated, 2,000,000 ($=\frac{1}{2}$ Britain).

295. Mesopotamia ("between the rivers") is the lowland region between the Arabian and Persian plateaux. Formerly richly productive by river-irriga-

tion the country is now **practically desert**, the lower parts, though capable of drainage, being mainly unhealthy swamps. Lands along the banks of the lower rivers, however, grow dates, maize, wheat, tobacco and cotton. Recent surveys have led to the adoption of a scheme for the revival of the ruined irrigation system which will reclaim over 5,000 square miles of the best land at a cost of over £15,000,000.

296. **Communications and Towns.**—The Euphrates is closed to foreign vessels. Ocean steamers drawing 18 feet may reach **Basra** (55,000), the chief port, where grain and dates are shipped. River steamers may ascend the Tigris to **Baghdad** (225,000), whose central situation makes it the natural capital, and whose importance is increased by the fact that it lies (*a*) where a short canal might easily, as in former days, give the city control of the navigation of both rivers; (*b*) on the direct caravan route from Syria and Asia Minor to the Persian Gulf; and (*c*) where the valley of a tributary offers a natural route up to the Persian plateau. **Mosul** (70,000) stands at the intersection of caravan routes at the head of navigation on the Tigris for small vessels. **Diarbekir** (38,000), on the upper river, also marks the intersection of routes, and ships goods on rafts down the river to Mosul. A neighbouring copper mine is among the richest in the world. The completion of the Baghdad Railway [Fig. 52], the revival of irrigation and the opening and improvement of the rivers should easily restore to the country its lost importance.

THE IRAN PLATEAU

297. Persia, Afghanistan and Baluchistan form the elevated Iran plateau, surrounded on all sides by lofty mountains which render the climate dry and conti-

mental. Being largely an area of inland drainage, much of it is salt desert and marsh-land. The region derives special importance from the fact that the all-land route from Europe to India will cross it [305].

PERSIA

Area, estimated, 628,000 square miles ($=5\frac{1}{2}$ times Britain); population, estimated, 9,500,000 ($=\frac{1}{5}$ Britain).

298. The parallel western limestone ranges are largely "karst" [212], furnishing only pasturage for sheep and goats, with intervening valleys productive by irrigation—often obtained by tunnels from the heart of the mountains. These valleys, containing the chief towns, grow grain and fruit (including oranges, apricots and peaches) to perfection; and the limestone soil produces excellent tobacco. Mulberry groves, rose gardens and vineyards are extensive, especially round Shiraz, noted for attar of roses and wines. **Teheran** (280,000), the capital, on the sheltered southern Elburz slopes, is surrounded by cotton-fields and mulberry-groves, and plantations of sugar, rice and tobacco.

299. Excellent pastures explain the high quality of Persian wool and horses. Forests occur on the moister slopes towards the Caspian and the Persian Gulf; elsewhere the only trees bear fruits, *e.g.*, olives. The region of **Seistan**, most of which lies in Afghanistan, is a depression watered by the Helmand, which feeds a salt marsh near the centre. Formerly productive, like Mesopotamia, by irrigation, it is now practically desert. The coast, backed by steep mountains, is dry, hot and unhealthy, yielding little but dates where an occasional mountain stream creates an oasis.

300. The varied **mineral wealth**, through lack of roads, fuel and water, is only partly utilised. Coal is

obtained near Teheran and in the south-east. Copper and iron are the minerals most commonly worked, the latter being rich and abundant. Kerman is celebrated for brass-work, and Ispahan and Meshed for swords; while Meshed jewellery is famed, local turquoise mines at Nishapur being the main source of the world's supply. Salt is naturally important, and petroleum abounds in the western highlands. Pipe-lines now being laid will pump the oil to Mohammera.

301. Industries and Towns.—Mineral industries have been mentioned above. **Yezd** and **Kerman** are noted for woollen carpets and felt; **Ispahan** (80,000), for tobacco, silks and velvets; **Shiraz**, for silk, velvets, wines and perfumery. **Tabriz** (200,000) has industries in leather, silk, and gold and silver ware. **Meshed**, amid wheat-fields and fruit orchards in the rich Heri-Rud valley, with manufactures of shawls, carpets, silks and velvets, is a sacred city. The surrounding slopes produce the finest horses and wool. The output of Persian carpets, made everywhere by hand, is steadily increasing, notably at Tabriz, Hamadan and Kerman.

302. Communications and Ports.—Communications are almost entirely by camel caravan; but lately some good carriage roads have been made by foreign enterprise. At Teheran and Meshed many routes converge. Ispahan is now connected by a good road with **Ahwaz**, at the head of navigation on the Karun. **Bandar Abbas** and unhealthy **Bushire** are useful roadsteads, but **Mohammera**, on a branch connecting the lower Karun with the Shat-el-Arab, can take large vessels and should therefore secure most trade. **Lingah** has pearl-fisheries. **Resht** and **Gez** are busy Caspian ports.

303. Commerce.—The chief centres are Tabriz, Teheran and Ispahan. **Exports** include cotton, fruits

(fresh and dried), carpets, rice, silk, opium, hides and skins, gums, wool and animals; the chief imports being textiles, sugar, gold and silver, tea, petroleum, iron and steel goods and apparel. Four-sevenths of the total trade is with Russia, one-fourth with the British Empire, and only one-sixteenth with Turkey.



FIG. 52.—SOUTH-WESTERN ASIA: RAILWAYS AND TRADE ROUTES.

304. **International Relations.**—Persia is a “buffer” state between the Russian and Indian Empires. This has led to an agreement between Russia and Britain confining Russian enterprise to the north of Persia, and British to the south; between the two “spheres of influence” lies a zone regarded as neutral. Less than one-third of the foreign trade passes through Persian Gulf ports; the bulk follows the Russian route *via* Resht, Baku and Batum, which is increasingly preferred

to the more difficult and costly caravan route *via* Erzerum to Trebizond. Russia strenuously fosters this traffic, excluding foreign goods from her railways.

305. **Proposed new railways** [Fig. 52] include an important line from Baku *via* Teheran and Seistan to connect with the Indian system in Baluchistan. This "**Trans-Persian Railway**" would provide a "through" connection from Calais to Bombay and Calcutta by using existing European lines. The 1,600 miles of new line would take four years to lay, and cost £21,000,000; but it would bring India within a week of London, the quickest journey at present taking fourteen days. A projected Russian line from Ashkabad to Meshed would attract the trade of the Heri-Rud valley.

AFGHANISTAN

Area, about 250,000 square miles (=twice Britain); population, about 6,000,000 (=1 $\frac{2}{5}$ Britain).

306. Afghanistan is the highest, most barren and most difficult part of the Iran Plateau; its climate is therefore even more extreme than that of Persia, and the country is mainly pastoral, typical products being skins, wool and camel-hair, and typical industries the making of felts, carpets and articles of wool and hair—chiefly at Herat and Kabul. Sheltered valleys, particularly those of the Heri-Rud and the Kabul, produce by irrigation most grains (including rice), the mulberry for silk, and fruits—especially stone varieties, which are dried and exported mainly from Kandahar. Northern mountains are rich in copper, lead and iron, and gold and precious stones are found; but prospecting for coal has hitherto proved futile.

307. **Communications.**—The pivot of the country is the Koh-i-Baba range, between which and the Hindu

Kush the Bamian Pass offers a route from Peshawar to Bokhara [Fig. 52]. The country is a "buffer" state and important link between India and central Asia, although "through" trade is now unimportant. A strong attitude against railways has always been maintained, and two Russian lines to the frontier simply await permission to cross the country and offer alternative routes to the Trans-Persian [305].

308. **Foreign Trade** is mainly with India. **Exports** include horses, cattle, wool, hides, carpets, silk, fruit, vegetables, grain, pulses, drugs, spices and tobacco; and **imports** cotton goods, dyes, sugar and tea.

BALUCHISTAN

Area, 45,804 square miles ($=1\frac{1}{2}$ times Ireland); population, 1911, 414,412 ($=\frac{1}{16}$ Ireland).

309. Baluchistan is now an Indian province. Surface, climate and products are similar to those of Afghanistan, and the country is doubtless rich in minerals. Iron, lead, coal and salt are worked, and petroleum exists. **Manufactures** include iron-work for agricultural purposes, weapons, felts, rough blankets and rugs, leather-work and pottery; and there are flour-mills and breweries at Quetta. The country is crossed by really good roads, and by the Bolan Pass railway to the Afghan frontier. **Gwadur** is the only port of any size. The small trade is mainly with India, Persia and Afghanistan, the chief **exports** being mustard, rape-seed, wool, grain, dates and matting, and the chief **imports** textiles, fruit, animals and hay.

ASIATIC RUSSIA

310. Asiatic Russia covers one-third of the entire continent, forming a continuous territory from Europe

and the Iran Plateau to Behring Strait, and stretching from the latitude of Greece to that of north Greenland. The climate is increasingly continental towards the east; and almost every variety of country is found from frozen lands and forested mountains and plains to arid steppes and salt deserts.

RUSSIAN CENTRAL ASIA

Area, 655,927 square miles ($=5\frac{1}{2}$ times Britain); population, 1911, 6,788,100 ($=\frac{1}{7}$ Britain).

311. Western Turkistan and Trans-Caspia together form Russian Central Asia, flanked by the Caspian Sea and the Pamirs and sloping from the southern and eastern mountains to the steppes. The region is mainly barren, with large and rich river-irrigated oases. Being entirely a region of inland drainage it contains salt lakes, and many rivers lose themselves in salt deserts. In the south and west, only Saxaul hedges keep frequent severe sand-storms from engulfing the Trans-Caspian Railway like many a town in the past. The shallow Sea of Aral and Lake Balkhash, both salt, are gradually shrinking, and their important fisheries declining. Cattle, horses, sheep and camels are reared wherever pasturage exists. The oases, irrigated from glacier-fed rivers (Amu, Syr and Ili), grow grain (including rice), fruits (especially stone varieties), the mulberry for silk, and—above all—cotton; and all share in the manufacture of cotton, silk and wool.

312. The most productive area is **Ferghana**—the upper Syr valley. It is deeply covered with rich black soil brought down from the Hindu Kush in summer by the flooded river, and produces, from American seed, enormous quantities of fine "Upland" cotton [100], besides the usual grain and fruit crops.

Flax and tobacco are also successful, and fine silk is produced; while the rich upland pastures graze particularly fine cattle. The cultivated area is rapidly increasing, the cotton-fields alone having been doubled in two years and yielding four times as much fibre (at the high rate of 300 pounds per acre) as all the rest of the region. The undeveloped upper **Ili valley**, similar in soil, climate and general conditions, is at present noted mainly for the leather derived from its rich pastures. Kara-Kul is famed for black lambs' wool ("astrakhan"). Wine is promising, particularly in the south-west, the sandy soil and dry heat being antagonistic to the dreaded phylloxera. The mountains are rich in minerals, but only iron is appreciably worked. Petroleum abounds near the Caspian and furnishes fuel for Trans-Caspian locomotives—an important consideration in the absence of coal.

313. The Murgh-ab dwindles and disappears after feeding the Merv oasis; while Samarkand and Bokhara exhaust the Zarafshan before it can reach the Amu, the further development of Samarkand being consequently at Bokhara's expense.

314. **Industries and Towns.**—**Bokhara**, commanding several important routes, conducts an extensive trade in local and imported goods and is famed for ornamental steel and leather-work, sheepskins and dried fruits. **Tashkent** (201,191), irrigated from the Syr, and directly connected by rail with central Russia [Fig. 53], is the largest and finest town in Asiatic Russia. There are textile, leather and metal industries, and knives and fire-arms are made; but luscious fruits are the most noted product. **Kokand** (112,428), also watered from the Syr, is a large market for animals and their products and the usual textile fabrics. **Khiva**,

irrigated from the Amu, is specially noted for camels and sheep. **Ashkabad** and **Kushk** are frontier towns destined to develop with railway extension.

315. Communications.—Apart from railways constructed or projected [Fig. 53], communications are entirely by camel caravan. Andijan and Marjilan, the termini of the Trans-Caspian Railway, communicate by difficult passes with Kashgar and Yarkand in Chinese Turkistan; but the easier Ili valley route through the Dzungarian Gate to Kulja is preferred. The **Syr** and the **Amu**, both shallow, provide considerable navigation for small craft.

316. Foreign Trade is mainly with Russia, the large share formerly conducted with Chinese Turkistan having almost vanished. Of **exports** cotton is far the largest item, five-sixths coming from Ferghana and the rest mainly from Khiva, Bokhara and Merv. Most of it goes by rail to Russia. Other important items are animals, hides, silk and astrakhan. **Imports** are mainly manufactured goods and tea.

317. The Future.—Russia, importing one-third of her cotton requirements, hopes by developing the oases soon to dispense with foreign supplies. Such development, however, is mainly a question of irrigation, and the full consumption of rivers for that purpose would lessen their value as communications and seriously affect the already diminishing lake fisheries.

TRANS-CAUCASIA

Area, 95,405 square miles ($=\frac{5}{8}$ Britain); population, 1911, 12,037,200 ($=\frac{4}{15}$ Britain).

318. This is a depression between the Caucasus and Mount Ararat, drained by the Kur to the Caspian and the Rion to the Black Sea, and crossed by a ridge

between their upper courses. The protection of the Caucasus and the Black Sea influence temper the winter cold and the summer heat, and plentiful rains in the west clothe the mountains with forest. In the south and east the country is dry and mainly pastoral; but elsewhere climatic conditions render the rich soil most productive. Grain and fruits grow to perfection, the mulberry flourishes, cotton and tobacco are important and even tea is grown in parts. In sheltered Caucasian valleys the vine is increasingly important, the wine being excellent; and the fine upper Rion pastures have been famed for wool since ancient times.

319. **Minerals** are abundant. Iron and manganese both occur near the Black Sea, particularly round Batum; and there is an extensive field of excellent coal at Kutais, in the Rion valley. Copper is mined at Elizabetopol, and rock-salt at Erivan. The outstanding product, however, is **petroleum**, found in exceptional volume on the Caspian shores, mainly round Baku (177,777). Oil-refining is the chief industry, particularly at Baku, Poti and Batum. The few manufactures, centred at Tiflis and Erivan, include textiles, carpets, embroidery and weapons.

320. **Communications and Towns.**—The only railways passing from north to south of the lofty Caucasus do so at either end. Batum has the best harbour on the eastern Black Sea coast. **Tiflis** (196,935), the capital, commanding various routes, including the only feasible road over the Caucasus *via* the Dariel Pass, is the chief commercial centre and the second city in Asiatic Russia.

321. **Foreign Trade.**—The chief **export** is oil, conveyed from Baku, by rail and through pipe-lines, to the Black Sea coast. It is exported mainly from Batum, partly in iron “drums” for convenience in tranship-

ment, and partly in bulk by tank-steamers. Considerable shipments reach central Russia from Baku *via* the Caspian and the Volga. Wine, silk and cotton are other important exports. **Imports** are largely manufactured goods.

SIBERIA AND THE STEPPES

Area of Siberia, 4,831,882 square miles ($=2\frac{2}{3}$ times Russia); population, 1911, 8,719,200 ($=\frac{1}{5}$ Russia).

Area of Steppes, 710,905 square miles ($=\frac{2}{3}$ Russia); population, 1911, 3,319,200 ($=\frac{1}{40}$ Russia).

322. Siberia and the Steppe provinces are together considerably **larger than Canada**, to which they are similar in character, climate and products. Most of the region is more or less level with a gentle northward slope—except in the mountainous east. Much of the north, as in Canada, is tundra [141], supporting only reindeer and yielding fossil ivory.¹ To the south lies the great forest belt, which has already been discussed [142], and which meantime yields only valuable furs and skins (*e.g.*, sable, ermine and silver fox), forming—with seal-skins from the Arctic shores—the basis of the great fur fair at Irbit, near Ekaterinburg.

323. **The Steppes**, south of the forests, are too dry for tree-growth; the spring melting of a fair winter snow-fall assists the early rains and warmth to promote a rapid grass-growth which is quickly scorched by the dry summer and autumn heat. The grass is naturally poorer towards the hotter, drier south, where, as in Turkistan, the slope of the land occasionally forms an area of inland drainage with salt marshes. The population is naturally nomadic and pastoral, passing on from spot to spot as the pasturage is exhausted, and

¹ Tusks of the extinct mammoth found embedded in the frozen soil.

settling down in winter with stores of hay accumulated from the summer growth. The climate favours **wheat**, that grain being the chief product—after **hay**—of the cultivated regions; and, with railway extension, the rich soil should yield a rapidly-increasing contribution to the granaries of the world [66].

324. **Western Siberia** (*i.e.*, west of the Yenisei) is a low-lying, level plain, whose great misfortune is that the magnificent **river system**, offering about 9,000 miles of valuable summer navigation, feeds an ocean either frozen or obstructed by ice for practically the whole year. Though much smaller than eastern Siberia, the potentially productive area is much larger and more accessible. The rich Russian "**black earth**" **belt** of extraordinary richness [654] extends over the Urals as far east as Tomsk, almost reaching marshy Tobolsk in the north and pastoral Akmolinsk in the south. **Omsk** (88,900), practically in the centre of this belt, where the Irtysh is crossed by the Trans-Siberian Railway, is an important collecting and dispatching centre for wheat, butter and eggs. Fast trains convey most of the butter and eggs direct to Baltic ports for export—mainly to Denmark and Britain; but most of the wheat goes by river to Tiumen and thence by rail to Russia. Other important crops are oats, rye, flax, hemp and potatoes.

325. The most fertile part, however, and also, as it happens, the richest in minerals, lies south of the railway from the Ob to the Yenisei, extending almost to Semipalatinsk. It is said that this district alone might grow sufficient wheat to feed 600,000,000 people; it is certainly capable of a marvellous production when opened up by railways. Where the navigable Ob crosses it, as at **Barnaul**, rich wheat-crops are raised

and cattle and poultry-rearing are important, heavy shipments of meat and eggs being sent down the river to the railway. Contemplated railway extensions [Fig. 53], with an efficient cold-storage system, might almost enable the town to repeat the phenomenal growth of Chicago as a grain and meat centre. At **Kuznetsk**, about half-way between Barnaul and Krasnoyarsk, is an enormous field of excellent coal extend-

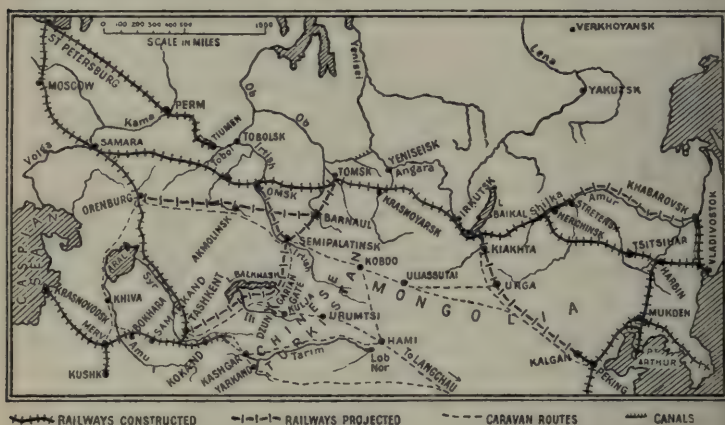


FIG. 53.—NORTHERN ASIA: RAILWAYS AND TRADE ROUTES.

ing almost to the railway. As the district is rich in iron and copper, it should also develop industrially. The Altai region to the south is rich in gold, silver, lead and precious stones.

326. **Petropavlovsk**, where the railway crosses the Ishim tributary of the Irtysh, is a large cattle-raising centre, and railway extensions will similarly foster the already important pig and sheep-rearing industries of **Kurgan**, on the Tobol, and **Akmolinsk** respectively; while the latter town possesses a large field of second-

rate coal and important local deposits of copper, graphite and manganese. At **Semipalatinsk** rich silver and copper mines are worked and platinum is found.

327. The **Trans-Siberian Railway**, mainly a single line, is being rapidly doubled in sections. Most of the chief towns are found where it crosses navigable rivers, *e.g.*, Petropavlovsk, Omsk, Tomsk and Krasnoyarsk, all great agricultural centres. **Tomsk** (111,417), the capital, is the best-built town and the chief depôt for Altai products. Other towns either lie at the head of river-navigation, *e.g.*, Akmolinsk, Semipalatinsk and Barnaul, or, like Tobolsk and Yeniseisk, are important river junctions. All have river communication with **Tiumen**, a railway terminus of increasing importance directly connected with Petrograd *via* Perm. The proposed **South Siberian Railway** from Orenburg will cross the great Ob-Yenisei-Altai agricultural and mineral region, and will doubtless develop it by branch lines.

328. **Eastern Siberia**, though much larger than Western, is not nearly so important commercially. It is more remote; its climate is more extreme; and, although it undoubtedly possesses a greater timber-wealth and valuable mineral resources, no coal has so far been discovered beyond an unimportant field in Sakhalin. The agricultural possibilities, though great, cannot compare with those of Western Siberia.

329. The three great **river systems** provide thousands of miles of navigation, and a short canal from the Lena to the Lower Tunguska tributary of the Yenisei would enable steamers to reach Tiumen from **Yakutsk**, the great Lena fur centre. The Yenisei is navigable to Krasnoyarsk, and the Angara to Irkutsk. The Amur, forming part of the Manchurian frontier, is navigable to its junction with the Shilka, which may

be ascended to Stretensk; but it is ice-bound for half of the year, there is a troublesome bar at the mouth, and floods and rocks make navigation dangerous. The Usuri tributary, also forming part of the Manchurian frontier, is navigable for a considerable distance. Stormy Lake Baikal is fresh and full of excellent salmon.

330. There are two important **agricultural areas**; (a) a continuation of the rich belt of Western Siberia [324] beyond the Yenisei almost to Irkutsk, and (b) lowlands in the Amur and Usuri valleys. The former is capable of great development when opened up; where crossed by the railway, animal-rearing is important, and wheat, oats and rye are largely grown. The wheat finds its way by river and canal to Tiumen. The Amur-Usuri valleys are too moist for wheat; but the rich pastures and prolific crops of soya bean [343] lead to cattle-rearing for meat.

331. The three chief **mineral regions** are (a) the Sayansk highlands, from the upper Yenisei to Lake Baikal; (b) the Amur highlands; and (c) the extreme north-eastern highlands. All are rich in gold, but quartz-crushing is little developed, and the metal is mainly obtained by washing gold-bearing gravel. The Sayansk region is also rich in silver, lead, graphite (from the famous Alibert mine), nitre and precious stones; and its trade is shared between Krasnoyarsk (62,919) and **Irkutsk** (108,060), the latter being the capital, the largest and busiest town, and the chief manufacturing centre. The Amur highlands yield also silver, iron, copper, lead and quicksilver; the chief trading centre is Nerchinsk, on the upper Shilka.

332. As a result of the Russo-Japanese war the Manchurian railways passed, with the stronghold of Port Arthur and the port of Dalny, into Japanese hands; and the all-Russian line to Stretensk is now proceeding

down the Amur valley to Khabarovsk, where an existing line to Vladivostok enables the Amur traffic to avoid the long northerly course of the lower river and its dangerous bar. **Vladivostok** (91,464), 5,400 miles by rail from Moscow, is an important port, with a large and increasing trade mainly with eastern Asia and North America; but ice-breakers are required in winter, and it is much inferior to the lost Dalny—now Dairen—whose harbour is one of the finest on the Pacific and ice-free all the year.

333. The **opening-up of new land** is actively encouraged, a policy devised to develop the country, dispose of the surplus home population, and create vast new markets for Russian manufactures. At present 4,000,000 acres of new land, or rather more than the area of Yorkshire, are brought each year under the plough. Free railway tickets and loans of money are granted to “likely” settlers, and the yearly rate of migration from Russia has lately risen to 700,000, a rate unapproached in any land but the United States.

CHINESE TURKISTAN

Area, about 550,340 square miles ($=4\frac{1}{2}$ times Britain); population, about 1,200,000 ($=\frac{1}{3}$ Greater London).

334. Eastern or Chinese Turkistan is a lofty plateau, surrounded by high mountains; the climate is continental and very dry, the country being desert, with oases created by snow-fed mountain streams. The northern part—Dzungaria—is important as offering the main trade-route from China to Europe *via* the Dzungarian Gate [Fig. 53].

335. Kashgaria, the southern part, traversed by the Tarim and its tributaries feeding the reed-grown salt swamps of Lob Nor, is dotted with productive oases. Fruit crops,—notably, as on the Iran Plateau and in

Russian Turkistan, stone varieties,—are exceptionally bountiful and furnish the staple food. Silk is produced, and mountain pastures yield leather and the finest wool; while gold and jade—a green stone much prized in China—are obtained on the Kuenlun slopes.

336. **Kashgar**, the capital, on the largest and most productive oasis, has fine cloth manufactures, and commands eastward and westward routes. **Yarkand** and **Khotan** are other important oases, both manufacturing leather, wool and silk, and producing gold and jade; the former commands the difficult Karakoram Pass to Kashmir, by which hides, skins, leather and gold are sent to India.

MONGOLIA

Area, about 1,367,600 square miles ($= 10\frac{3}{4}$ times Britain); population, about 2,600,000 ($= 1\frac{1}{8}$ Britain).

337. Mongolia is an elevated plateau with a continental and excessively dry climate. The country, though really fertile, is sandy; and want of water makes it **almost entirely desert**. The scanty growth, however, and occasional grass tracts enable animals to be reared. Wool, hides, skins and live-stock are natural products, all being found at the northern market town of **Urga**, where Chinese and Siberian produce are exchanged. Though a powerful natural obstacle assisting to isolate China, the desert is crossed by well-defined caravan routes [Fig. 53]. That from Peking to Siberia *via* Urga will be followed by the new railway to be constructed under Chinese auspices.

TIBET

Area, about 463,200 square miles ($= 4$ times Britain); population, about 6,500,000 ($= \frac{1}{2}$ Britain).

338. Tibet is a **vast plateau of exceptional height**, entirely surrounded by mountains containing the world's

loftiest peaks. The climate is continental and dry, the elevation making the winters exceptionally severe. The plateau is mostly divided by minor ranges into wide, lake-studded valleys, fit for little but pasture and rich in wild animal life ; the broad southern mountain edge is furrowed by the upper courses of many mighty rivers (*e.g.*, Yangtse, Mekong, Salwin, Brahmaputra and Indus) ; and the milder and moister climate of these valleys enables them to grow oats, barley, pulses and even fruit. Most of the population is naturally found here ; and **Shigatze**, on the Sanpo (the upper Brahmaputra), and **Lhasa** (20,000), the capital, on a tributary of that river, are the chief centres.

339. Animals, particularly the sheep and the yak, are reared on the bleak pastures and the upper valley slopes. The yak, which can endure great cold and will thrive on very poor pasture, is the mainstay of most parts, supplying the people with milk, meat, and hair for cloth. Gold, silver, borax and salt are the chief minerals worked, and weaving and metal-working are the chief industrial occupations. The trade is mainly with China, *via* the Yangtse valley to Sechwan, and India, *via* the Indus valley and various Himalayan passes. The chief **exports** are gold, silver, wool, woollens, furs, drugs, salt and musk (from the musk deer). **Imports** include brick tea [358] and cottons from China, animals and their products from Mongolia, and silk, rice, sugar, indigo and spices from India.

340. The difficulty and inhospitable character of the country and the opposition of the people to foreign intrusion make Tibet **one of the world's least-known lands**. It is only within recent years that successful exploration has been undertaken.

MANCHURIA

Area, about 363,610 square miles (=3 times Britain) ; population, about 20,000,000 (= $\frac{1}{5}$ Britain).

341. Manchuria, much the richest of China's external dependencies, is separated from Eastern Siberia by navigable rivers—Amur and Usuri. It is mainly a plain, cut off from the monsoons by mountains, and sharing the dry, continental climate of most of Asia.

342. The drier west, mainly "steppe" land [323], provides excellent pasture for sheep and goats, whose wool and skins are important ; while the rich soil in the moister east yields large crops of soya beans, millet, wheat, hemp and ginseng.¹ The wheat is particularly rich in gluten ; and the feeding properties of soya bean-cake make cattle-rearing important. The country, still thinly populated, is being gradually settled by the Chinese, who rightly regard it as a valuable future source of food-supply and a much-needed outlet for their surplus population. The mountains are rich in minerals, particularly coal and iron ; but they are little developed, although a rich coal-mine at **Fushun** yields, by modern methods, about 5,000 tons daily, and is believed capable of maintaining this output for 500 years. The mountain forests yield valuable skins.

343. The **soya bean** is a notable product. It is rich in oil, and the residue, made into "**bean-cake**," is a valuable cattle-food and fertiliser. Though cultivated in Manchuria for centuries, the bean was unknown in Europe before 1908. Its introduction there led to an immediate and phenomenal demand, over 400,000 tons being taken in 1909. There is considerable difficulty

¹ A plant whose root yields a drug much valued in China.

in finding vessels to convey the beans, the British import alone having risen to over 420,000 tons in 1910.

344. **Communications and Towns.** — **Mukden** (158,132), the capital of the chief province, is centrally situated on the southern plain where converging railways meet [Fig. 53]. It is close to the Sungari tributary of the Amur, which is navigable to **Girin**, the eastern capital, another town of promise. The Trans-Siberian Railway passes through **Tsitsihar** (30,000), the western capital, at the head of navigation on the Nonni. **Niuchwang** (50,000), 30 miles up the Liao river, is ice-bound for four months every year and rapidly declining in favour of **Ying-tse** (60,000), at the mouth of the river, which is always open. **Port Arthur** and Dairen passed into Japanese hands at the close of the Russo-Japanese war.

345. **Foreign Trade** is included in Chinese statistics. Besides soya beans, wheat is largely shipped from Vladivostok. Both products are sent to China, with millet, ginseng and skins; and wheat and hay cross the frontier to Siberia. The chief import is cotton goods from the United States.

QUESTIONS

37. Explain why the proximity of Africa affects the climate of south-west Asia.

38. Describe the climatic conditions in coffee-growing Yemen.

39. Discuss the future of (a) Baghdad; (b) Barnaul.

40. Why does no direct caravan route from Kabul to Herat appear in Figure 52?

41. By what different routes, existing and proposed, might one travel from London to Bombay?

42. The Amir of Afghanistan opposes railway construction. Discuss the wisdom of his attitude.

43. Why is Lake Balkhash salt? Why Lake Baikal fresh?

44. Which is the most densely-peopled part of Asiatic Russia, and why?

45. Account for the indirect route proposed for the Trans-Persian Railway from Teheran to Baluchistan [Fig. 52].

46. Why is the Sea of Aral shrinking?

47. Estimate approximately the area of rich "black earth" land in Siberia [§§ 324-5], and calculate roughly how many years it would take to open it up at the present rate of 4,000,000 acres per annum [§ 333].

48. How many steamers, each carrying 5,000 tons, would be required to convey soya beans to Britain in 1910? [§ 343.]

CHAPTER V

MONSOON ASIA

346. SOUTH-EASTERN ASIA is dominated by the monsoons [288]; the climate, therefore, is characterised by wet summers and dry winters, the temperature of both seasons varying with latitude and topography. The summer monsoons blow towards India from the south-west, and their direction gradually changes until in China they blow from the south-east [Fig. 51]. The converse is true of the winter monsoons.

CHINA

Area, 1,532,420 square miles ($=\frac{5}{8}$ Russia); population, 1911, 407,253,030 ($=3\frac{1}{3}$ times Russia). Both estimated.

347. In endeavouring to understand China the student should recollect that her civilisation had already existed for over a thousand years when Julius Caesar was subduing savage Britain, while only four centuries have passed since the beginnings of European exploration. Till then China, at the "end of the world," faced an ocean subject to terrific storms ("typhoons"), and remotely bounded by inhospitable, uninhabited or barbarian shores; while, by land, communication with the outer world was possible only by camel caravan over vast deserts, or on foot by a very few still more difficult routes across rugged mountains and precipitous gorges.

348. This **isolation** largely explains the predominance of agriculture and fishing despite the existence of untold mineral wealth. Ignorance of modern ideas and lack of capital and communications have combined to prevent industrial development and mineral exploitation. Now, however, suspicion of the foreigner is passing, the advantages of international intercourse aided by modern means of transport are becoming more fully realised, and enterprise is growing, though somewhat slowly, in many directions. Railways are spreading, and there are now quite a number of cotton, silk and oil mills and other industries.

349. The rich soil in the summer warmth and moisture is extraordinarily productive; it is thus natural that **agriculture** should have become the first concern of the Chinese. The land is parcelled among small owners subject to an annual tax, most holdings being mere gardens; and close personal attention makes them—despite primitive methods—still more productive.

350. China falls into three natural regions. Northern China includes the basin of the Hwangho and the lower valley and delta of the Yangtse; through its southern mountain boundary the latter river emerges from Middle China,—the middle valley and most of the Nan-shan highlands crossed by southern tributaries. South of the Nan-shan range is Southern China,—mainly the basin of the Si-kiang. Each region includes extensive western highlands.

351. **Northern China** has a warm, moist summer, the winters being very cold through the absence of protection against winter monsoons from the cold Asiatic interior [Fig. 48]. These winter winds, however, have “made” the country, bracing and toning the people whose energies are sapped by the moist

summer heat, and pulverising the soil and covering it with fine sand brought in clouds from the Mongolian desert. This sand or "**loess**" [20], being decomposed rock rich in plant food undissolved by rain, has built up a soil of quite exceptional richness, covering hills and valleys sometimes to an enormous depth; while the Great Plain—crossed by the Hwangho and extending from Peking to Hangchau—is covered with a mixture of loess and alluvial soil.

352. Though rich, the soil is thus porous; and a comparatively brief stoppage of the rainfall is as disastrous to crops as prolonged drought in the case of a less porous soil. **Irrigation**, from rivers or wells, is thus practically necessary; and frequently each small holding has its own well for the purpose. The density of the population ensures the cultivation of every possible acre, even hill slopes being terraced and tilled to a great height. Natural products are barley, wheat, millet, maize and beans; while Langchau, in the upper Hwangho valley, grows excellent tobacco. Much "wild" silk [123] is obtained in the forested Shantung highlands.

353. The **Hwangho** ("China's sorrow") is broad, but too rapid and shallow to be of use except for irrigation. It is liable to abnormal floods, sometimes involving enormous loss of life, and sometimes even entirely changing the course of the lower river. Repeated disasters of the kind have led to the construction of high tree-planted banks, the root-growth giving additional strength; but even they may not be sufficiently high or strong to control the river at its highest. A great railway bridge has been built over the lower river, but, as has been said, "it remains to be seen whether the river will continue to be so obliging as to flow under it."

354. **Middle China** has a hot, wet summer, and a fairly mild winter because sheltered by the northern mountain boundary. The upper Yangtse valley is deeply covered with a rich, porous red soil, the middle valley being alluvial. General conditions of cultivation are similar to those of Northern China. The greater lowland heat favours rice, cotton and sugar; while cereals and pulses are grown everywhere, and an important crop is "China grass," a kind of nettle yielding a fibre largely woven into cloth for summer wear. Most of the great silk output is raised in the valley—especially in Sechwan; and tobacco is grown on the lowlands.

355. The **Yangtse** is a splendid navigable river, large steamers penetrating 1,000 miles to Ichang, and ocean steamers to Hankau. Above Ichang, 400 miles of difficult rapids are now negotiated by special flat-bottomed steamers travelling to Chungking, the river port of the rich province of Sechwan. Although the river is subject to occasional floods during the summer rains, lakes on the south side absorb most of the surplus water and regulate the flooding. The Han tributary is wide and navigable, and many others are useful for both navigation and irrigation.

356. **Southern China** experiences hot, moist summers and warm winters. Characteristic products are thus rice, sugar and cotton, and much silk is produced. Highland Yunnan is the opium-growing¹ province.

357. Mountains have been **deforested** except in the north and west; but two trees are still important,—one whose dried sap is camphor, and the other whose twig-bark yields cinnamon. The inner mulberry bark makes paper, and the bamboo is widely useful. River and

¹ The cultivation and import of opium are both being gradually suppressed by law, the former to cease entirely in 1917.

sea **fisheries** are important, and coral, tortoiseshell and salt are shore products.

358. **Silk** is by far the chief export [Fig. 54], despite the consumption of half the output for garments for the wealthier classes, China being still the largest source [Fig. 24]. Spinning and weaving are ubiquitous, handlooms being scattered throughout the country; but quite a number of steam "filatures" and weaving-mills have been established at Shanghai, Canton, Nan-king and Hangchau, the chief silk ports being the first two and Ningpo. **Tea** [87] is a special product of deforested south-eastern slopes. Superior leaf, compressed into tablets, has long been a special export to Russia *via* the Mongolian desert [Fig. 53] and Siberia, the latter stage being traversed formerly by enormous numbers of sleighs but now by rail.¹ Inferior teas, treated with rice-water, are compressed into brick form for export by human carrier to Tibet. Hankau is the great tea-market and port, although much black tea is handled at Amoy and Fuchau.

359. **Cotton**, one of the largest crops, is mainly consumed in the country, although the export is considerable. The product of each small holding is commonly

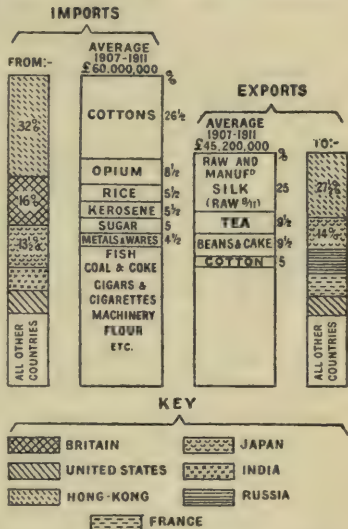


FIG. 54.—CHINA: FOREIGN TRADE.

¹ Most of the export, however, is now sent by sea.

woven at home and sold as fabric, oil from the seed being used as an illuminant and the residue as a fertiliser [106]. Cotton-mills have recently been erected at Shanghai, Canton and Hangchau. Other products of importance are few. Cultivation being so general, pasturage is scarce, and comparatively few animals are reared beyond hogs and poultry; both are important for food, and eggs are exported to Japan. Wool should become an important product of unused highland grazings when made accessible by railways. The growing scarcity of timber and increasing building requirements necessitate a rising import. It is notable that beans, mainly soya [343], already rank second, with tea, as an export. The demand for rice requires a large import, and its export is illegal.

360. **Minerals.**—Of coal alone China is estimated to possess about twenty times as much as all Europe. It exists nearly everywhere, but the most extensive and remarkable field is in south-eastern Shan-si, where extraordinarily thick seams of very pure anthracite cover some 13,500 square miles, or considerably more than twice the area of Yorkshire. So near the surface are the seams that railways might be run right into them. Eastern Sechwan, northern Yunnan, northern Honan and south-eastern Hunan also contain vast untouched coal areas, while a mine north-east of Tientsin has been worked for some considerable time. Tin and copper both abound in Yunnan, Sechwan and Hupé, Yunnan also yielding gold and precious stones, and Sechwan salt. Shan-si and Honan are rich in fine iron; and Honan also in potter's clays and salt.

361. **Industries.**—Textiles have already been mentioned. Straw-plaiting is practised everywhere. Domestic metal industries include iron-work in Shan-si, and

copper and bronze goods where copper and tin are found (Yunnan, Sechwan and Hupé). Porcelain works and potteries utilise suitable clays, *e.g.*, at Poyang. Flour and rice mills are numerous, especially at Hankau, Shanghai, Chifu and Canton; and convenient coal and iron now support large Government iron and steel works at Hankau.

362. **Communications.** — Yangtse navigation has



FIG. 55.—THE FAR EAST: RAILWAYS AND ROUTES.

already been discussed [355]. Coasting steamers may ascend the Peiho—except in winter—to Tientsin (800,000); the Si-kiang, with occasional rapids, is navigable only in stretches. The northern half of the 700-mile Grand or Imperial Canal from Tientsin to Hangchau has fallen into disrepair, but the southern half is still much used. Communications otherwise, except for the few railways [Fig. 55], are conducted by

poor roads, and still largely by human carrier; transport is therefore still expensive and unsatisfactory.

363. **Chief Towns and Ports.**—**Peking** (1,300,000),¹ the capital, commanding approaches from Mongolia and Manchuria, is politically rather than commercially important, being far excelled by **Hankau**² (826,000), the second port, whose central situation near excellent coal and iron, amid cotton-fields and mulberry-groves, aided by the convergence of waterways and railways, gives it increasing importance as an industrial and commercial centre. The absence of ports between the excellent harbour of **Tsintau** and the Yangtse is due to the unbroken flatness of the coast; **Shanghai** (651,000), the chief port, is therefore important as serving both Middle China and most of the enormously productive Great Plain, but the unfortunate shallowness of the harbour diverts much trade to Hankau. **Canton** (900,000), the third port, suffers also from shallowness; but it has no competition, and commands waterways in three directions. The projected railway will bring to it the coal of Hunan; meantime it handles mainly silk and tea. Its textile industries are rapidly growing, and it is noted for metal-work and carved stone-work.

364. **Hangchow** (350,000), at the head of a gradually narrowing bay with a dangerous tidal bore, takes small vessels only; but it has rising textile industries, and commands the Grand Canal and railways to Shanghai and Ningpo (350,000). **Chinkiang** (184,000) is an important river port at the intersection of the Canal and the Yangtse, the Peking-Shanghai railway also passing through it. **Amoy** (114,000) and **Fuchau**

¹ The town populations given are official Chinese estimates for 1911 or 1912. ² Almost entirely destroyed in the revolution of 1911. It is being rebuilt on modern lines.

(624,000) are important tea ports, and **Wuchau** (59,000) marks the head of navigation on the Si-kiang. **Chengtú**, the centrally-placed capital of rich Sechwan, will be increasingly important as the province is developed. Its river port, **Chungking** (598,000), with growing metal industries, will also benefit greatly. **Nanking** (267,000), with intersecting railways and waterways, is rising industrially. **Si-ngan** (1,000,000), commanding caravan routes *via* Langchau, will be connected with the Peking-Hankau line.

365. **Hong-Kong** (366,145) is an island at the mouth of the Si-kiang belonging, with the opposite peninsula of Kaulun, to Britain. The magnificent harbour of Victoria, on the landward side, is a naval and commercial port of supreme importance, conducting a great entrepôt trade with Britain, China, Japan, India and Australia, and looking forward with special interest to the completion of the Canton-Hankau railway through the Hunan coal-field. **Macao** (63,991), an inferior Portuguese port at the mouth of the Si-kiang, was the opium import centre. The unhealthy island of **Hainan**, with important timber reserves and extensive sugar plantations, is periodically visited by typhoons; there are government gold and tin mines, and silver, lead and copper are found.

366. **The Future.**—There is little room, if any, for agricultural development, but it would be difficult to assign a limit to the extent or variety of possible industrial development. With great mineral resources, cheap labour, vast supplies of home-produced fibres and enormous home markets, China may become one of the greatest industrial lands at no very distant date.

JAPAN

Area, 147,655 square miles ($=1\frac{1}{2}$ times Britain); population, 1912, 52,200,679 ($=1\frac{1}{8}$ times Britain).

367. Owing to the monsoon influence, the climate is mainly wet in summer and dry in winter, the tem-



FIG. 56.—JAPAN: OCEAN-CURRENTS.

perature of both seasons varying with latitude, degree of shelter or exposure, and influence of currents. The warm, north-flowing Kuro-shiwo current [Fig. 56] washes the eastern shores, a branch entering the Sea of Japan by the Korean Strait; while the cold Arctic Kurile current meets and mingles with them round Hokkaido and in the Sea of Japan. The consequent partial condensation of the warm water-vapour over the warm currents causes the prevalent fogs. The unbroken **mountain backbone**, directly facing the monsoons, keeps the west drier than the east in summer, and renders the eastern winter mild except where the Kurile current lowers the temperature in the north.

368. The steep slope of the narrow, mountainous land makes rivers short, rapid and useless for navigation, although valuable for irrigation. Except in the north, reckless **deforestation** allows rivers, in the rainy season, to become perfect torrents, enriching the plains with loose volcanic soil at the cost of great damage and loss

of life through flooding. Remaining forests, however, are now carefully preserved, timber-cutting being limited to proper proportions; and heights round upper river courses are being planted with trees. One river so treated actually ceased flooding within ten years,—a convincing proof of the evils of deforestation.

369. **Agriculture**, as in China, and for similar reasons, is the main occupation. The volcanic plains, in the moist, hot summer, are most prolific; and holdings are mostly small, almost every available acre being tilled. Manuring is general, dried fish being used as well as imported Manchurian soya bean-cake [343]. Pasture is scarce and animals are few, the country almost entirely lacking meat, milk, butter, wool and leather; and the two last are largely imported. Japanese **fisheries** are among the most productive in the world [155], the submarine banks being supplied with abundance of fish-food by the Kurile current. Unfortunately, however, they are showing signs of exhaustion, and Japan is turning her attention to the rich fisheries of Korea.

370. **Hokkaido** or Yezo, although suffering long, severe winters during which the shores are frozen and the land is buried in snow, has a summer mild enough for cultivation. Sea and river fishing are extensive, chiefly engaging the small population. Mountain forests contain useful timbers, *e.g.*, oak, elm and birch; but fur-bearing animals, formerly numerous, are now almost extinct. There are important coal-mines near the excellent harbour of Hakodate, where an Anglo-Japanese steel company now uses vast local "sand-iron" [165] deposits. The venture, if successful, may compensate for the sad lack of good ore.

371. **Honshiu**, the main island, exhibits great contrasts of climate. Western winters are cold, increas-

ingly so towards the north ; and a dangerous surf beats on the coast of the foggy and stormy sea. Communication with the mainland is thus difficult, and the only port, Niigata, whose harbour is awkward under the best conditions owing to a troublesome bar, is practically useless during the winter monsoon. The mild eastern winter, on the contrary, accentuated by the Kuro-shiwo influence, enables wheat to alternate with the summer rice crop. **Kiushiu** and **Shikoku** are both hotter in summer and warmer in winter than eastern Honshiu.

372. **Products.** — **Tea** [87] is characteristic of the warm, rich, deforested slopes of Kiushiu, Shikoku and south-eastern Honshiu ; and exceptionally fine **rice** is produced in the same parts—with **silk**, of which Japan is one of the chief sources [124], tobacco, hemp, and some inferior cotton ; while rice is also important in western Honshiu, where the drier summers yield large wheat, barley and bean crops. Forests in western Honshiu still yield pine, cedar and maple, and the island is rich in bamboo, the hard kiyaki used in the ship-building yards of Nagasaki, and cypress. The camphor-tree is almost confined to the hotter south, while the lacquer-tree¹ grows in all parts of Honshiu. The wax-tree, supporting the candle-making industry, is found in Kiushiu, Shikoku and southern Honshiu. **Coal** abounds in north Kiushiu near Moji and Wakamatsu, near western Nagasaki, and at Hakodate. **Petroleum** is believed to exist almost continuously along the west coast from Sakhalin to Formosa, but is not, as yet, largely worked. Likely areas in Hokkaido and Formosa are being prospected. The Ashio copper-mines, near Nikko, are regarded as the largest in Asia ; and sulphur, natural in a volcanic land, is abundant.

¹ Lacquer, combined with camphor, makes a valuable varnish.

373. **Industries** are still largely domestic, factories being of quite recent growth; but development is rapid in all directions. The factory system is naturally most prominent in textile trades, favoured by a moist climate and abundant coal, water-power and cheap labour. Silk manufacture predominates round Tokyo, and cotton round Osaka—mainly from imported Indian and American fibres. Rising **woollen** industries use Australian and Chinese wool. There are large government iron and steel works at Wakamatsu, and ship-building is important at Nagasaki, coal being convenient at both places. Osaka and Kyoto, both with abundant water-power, are the chief industrial centres, others being Tokyo, Nagoya and Hyogo; and the many industries include most kinds of machinery, instruments and appliances, matches, and a great variety of artistic articles (including lacquered wood and metal wares), and distinctive products like umbrellas, fans, dolls and other toys. There are also flour-mills and fish-canning and chemical works; and sugar-refining is growing and likely to become important [376]. Saké, the national drink, is made from rice, and barley-growing is encouraged in Hokkaido to support a rising brewing industry.

374. **Communications, Towns and Ports.**—Good roads are really few. Railways, though quite recent, are already extensive, practically every town of importance being served. Tokyo, Kyoto (442,462), Osaka and Nagoya are the chief railway centres. Yokohama (394,303), the chief port, whose splendid harbour takes the largest vessels, handles more than half the entire foreign trade—chiefly silk and tea. Improvements now being made will enable large vessels to moor at the quays. Tokyo (2,186,079), the capital,

accessible only by small vessels, conducts its trade mainly through Yokohama. **Osaka** (1,226,590), the third port, has a poor harbour, and uses the neighbouring port of **Kobé** (378,197), which follows Yokohama in the volume of its trade, and where extensive improvements are also being made. **Hakodate** (87,875), **Moji** (55,682) and **Nagasaki** (176,480) are all coal ports, the last, with a splendid harbour and extensive docks

and ship-building yards, being specially important.

Nagoya (378,231) has largely ceased to be a port through the silting of the harbour. **Shimonoseki** (58,254) has considerable importance, and **Niigata** (61,616) has a special shipping trade in oil.

375. **Foreign Trade** (Fig. 57) has practically doubled within ten years. Japanese rice, in special demand because of its excellence, is nearly all ex-

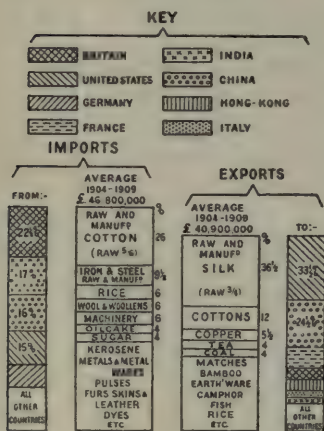


FIG. 57.—JAPAN: FOREIGN TRADE.

ported, cheaper rice being imported for consumption. Large silk and tea shipments to the United States explain that country's predominance as a customer. Other notable special exports are silk to France and matches to China; while British and German textiles and German machinery are notable imports. Three-fourths of the total trade is shared between Yokohama and Kobé.

376. Tropical **Formosa**,¹ with forest-clad mountains, produces mainly camphor, rice and tea; but the rich

¹ Area, estimated, 13,458 square miles (= $\frac{1}{3}$ Scotland): population, 1912, 3,443,679 (= $\frac{2}{3}$ Scotland).

soil and moist heat specially favour **sugar-cane**, the culture of which is being specially encouraged to render the Empire independent of foreign supplies. Extensive improvements at the western ports of Anping and Takau will enable them to handle a largely-increased production. There is good coal near northern Kilung. The southern half of **Sakhalin**¹ is Japanese, and is rich in unexploited timber, coal and petroleum. The winters are severe, but the summers are warm and moist, and large areas are suitable for both pasturage and agriculture.

377. **The Future.**—Although practically every available acre is already tilled, further agricultural development is receiving much attention. An extensive scheme of protective bank construction (*cf.* the Hwangho, § 353) has been undertaken, by which 65 rivers will be restrained from overflowing, and extensive rich areas thereby reclaimed. It is hoped that 20 rivers may be thus controlled by 1929. The **industrial growth** of Japan has been remarkably rapid, and the consequent demand for mechanical power naturally raises the question of the **coal supply**. At the present rate of increase of output the known coal resources would be exhausted well within a century; but by that time (a) the great coal-fields of China should be available; (b) the vast oil reserves should be yielding liberally; and (c) the enormous water-power, already partly harnessed—as at Kyoto and Osaka—by hydro-electric works [43], should be producing energy. It should therefore be clear that the industrial future of Japan is bright, keeping in view the large home markets, the abundance of native labour, and the marvellous national adaptability, enterprise and energy.

¹ Area, estimated, 12,500 square miles ($=\frac{2}{3}$ Scotland); population, 1912, 43,273 ($=\frac{1}{3}$ Edinburgh).

KOREA

Area, estimated, 86,000 square miles ($\frac{2}{3}$ Britain); population, 1912, 13,461,299 ($=\frac{3}{10}$ Britain).

378. Korea, formally annexed by Japan in 1910, is mostly mountainous, with a steep descent to the rocky east coast, and a more gradual slope to the wide, sandy, western coastal plain. Few forests remain, timber being an import. The eastern summer is hot and wet, the winter being cool and dry; while western summers are drier, the winters being dry and increasingly cold towards the north.

379. **Agriculture** and **fishing** are the main occupations, but methods are primitive, and the scarcity of water for irrigation is a serious drawback. Development, however, is progressing under Japanese influence. The main crops are rice, millet, soya beans, hemp, cotton and ginseng. The rice is excellent, and the increase in the export has been phenomenal.¹ The cotton is good, and cultivation is receiving special attention; it is said that undeveloped lands could grow sufficient fibre to supply Japan with fully one-third of her imported requirements. Silk-culture is promising, the climate being even more suitable than that of Japan; and the output is steadily increasing. Japanese immigrants are infusing new life into Korean affairs.

380. Fine grazing and soya bean-cake have earned a special reputation for Korean **cattle**, the rearing of which is receiving special attention. The island of Quelpart produces excellent ponies (*cf.* Shetland). Sea fisheries are important, but the fishing fleet, though four times as large as the Japanese, actually lands less fish, owing to primitive methods and lack of energy.

¹ From a value of 889,000 yen in 1905 to 45,530,000 yen in 1909.

Development in this direction should compensate for the threatened decline of Japanese fisheries [369]. The country is rich in coal and copper, and capable of supplying the iron industries of Wakamatsu [373] with most of the necessary ore. Rich gold-mines exist in the north, and salt is important.

381. **Se-ul** (278,958), the capital, now communicating by rail with Mukden [Fig. 54], stands at the head of the chief western river valley. Navigation is difficult on the west coast, especially in winter, owing to the high tides; and the only ports worthy of mention are Wiju, on the Yalu river, and Chemulpo, the port of the capital. Fusan, in the south-west, and eastern Wönsan (Gensan) trade with Japan, the latter chiefly in minerals. Three-fourths of the rapidly-increasing trade is with Japan, and nearly all the rest with China. The chief **exports** are rice, soya beans, ginseng, hides, wheat, barley, cattle and gold; and the chief **imports** cotton goods, cigarettes, coal, oil, timber, sugar, paper, iron goods and saké.

INDIA

Area, with Baluchistan and Burma, 1,097,821 square miles (=9 times Britain); population, 1911, 244,270,000 (=5½ times Britain).

382. Stretching over 2,000 miles from north to south and a similar distance from east to west, India is really more of a continent than a country, and climatic differences are great. Summers are rainy wherever elevated tracts intercept the monsoons [Fig. 58], but north of Gujarat the winds are drier and weaker, and the Indus valley and a large tract east of that river are practically rainless during the hottest season, and therefore desert except where redeemed by irrigation. Behind the abrupt Western Ghats the Deccan receives

but a slight, irregular rainfall. The more southerly monsoons from the Bay of Bengal deposit the heaviest known rainfall on the Khasi Hills in Assam, where—at Cherrapunji—the annual average is almost 500 inches; and the precipitation is also heavy on the eastern Himalayan slopes and the delta and lower Ganges plain. These winds, partly deflected by the excessively high northern mountain barrier, blow north-west-

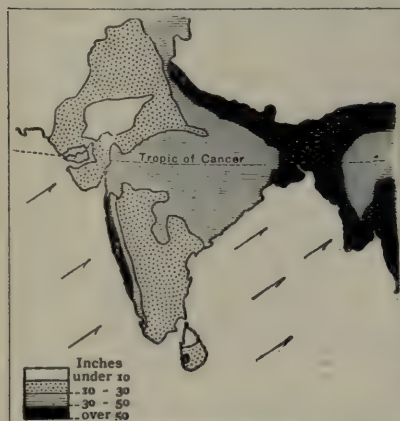


FIG. 58. — INDIA: RAINFALL DURING SOUTH-WESTERN MONSOON, APRIL TO SEPTEMBER.

ward from the delta, the rainfall gradually decreasing until, where the Gogra joins the main stream, it becomes too slight and uncertain for agriculture without irrigation.

383. Agriculture is the main occupation, engaging nine-tenths of the vast population. The great northern alluvial plain, much of the Deccan with its

black, volcanic soil, and the many great river-deltas, with their wide-spread fields of fine silt, are rich and productive; and the two main crops—rice and millet—furnish the staple food. The occasional failure of crops over large areas in regions of uncertain rainfall formerly caused disastrous famines and great loss of life; but railway construction has facilitated the rapid conveyance of food, and short crops, although causing serious money loss, have ceased to mean starvation.

384. By irrigation a total area about half that of

Britain is saved from either periodic crop-failure or entire sterility. Where rivers are available, as in the Punjab ("Five Rivers"), the Indus valley or the upper Ganges valley, both "inundation" and "perennial" canals are employed, as in Egypt. In other parts irrigation is obtained by storing occasional rains in huge tanks, as on the Deccan, or by sinking wells where water is available at a reasonable depth, as between the Ganges and the Gogra.

385. The **northern mountain barrier**, averaging over 150 miles in width, contains many parallel ranges of exceptional height, and is deeply furrowed by valleys and gorges—many impassable [338]. It is thus not only an effective climatic barrier, but a distinct barrier to intercourse between India and interior Asia, surmountable at only a few points. The Khaibar and Bolan Passes mark the most important points of penetration [Fig. 52]. Leh, the great Kashmir wool market, commands the trade with Chinese Turkistan through the difficult Karakoram Pass, and a feasible route reaches western Tibet by the valley of the Sutlej. Certain other passes leading to Tibet are commanded by Darjiling. The meagre population exists only where sheltered accessible valleys admit of cultivation—sometimes by terracing the hill-sides. The **Vale of Kashmir** is the chief. Formerly the basin of a great lake whose remains still linger as small and diminishing salt lakes, it enjoys an ideal climate, and wheat, millet, pulses and fruits are extensively raised; the vine is grown for wine, and the mulberry for silk. Kashmir pastures are famed for their wool, which supports the shawl, carpet and rug industries of the capital, **Srinagar** (126,344).

386. The **southern slopes** are increasingly forested towards the moister east, while above the forests graze

sheep and goats and even, here and there, cattle. The forests contain useful and valuable timbers—from tropical to temperate [142-144]. Among the former are the bamboo, teak and rubber trees of the hotter, moister east, the deodar and other cabinet trees being prominent in the United Provinces and supporting the furniture trade of Bareilly (129,462) and other towns. **Tea** grows to perfection on the hot and moist Assam forest clearings, and on similar land round Darjiling and Simla. The cinchona tree, whose bark yields quinine, is grown in Assam as a shade for the young plants.

387. The **Great Northern plain**, or the Indo-Gangetic plain, separates the Deccan plateau from the Himalayan slopes. It is low and flat except where, between the two river systems, the higher ground on which **Delhi** (232,837), the new capital, stands, expands and rises southward to the Aravalli Hills. The summers are very hot, and the winters warm and dry; while there is a gradual transition from the excessive summer moisture of the Ganges delta to the aridity of the Indus valley. Most of the plain, irrigated where necessary, is richly productive, and it supports more than half the entire population.

388. The **Indus**, shallow, with ever-changing sandbanks, is practically useless for navigation, although small craft may ascend it for 900 miles to Attock. The river, however, feeds a most extensive irrigation system. Like the Nile, it overflows in summer, and the land so enriched has always been, like Egypt, a streak of fertility through the desert; but now canals convey the surplus water far and wide, especially east of the river, rendering thousands of square miles highly productive and bringing more of the rich desert soil each year under cultivation. The chief products of the lower basin

are cotton, rice, millet, wheat, pulses and oil-seeds ; while desert grazings in Rajputana support large herds of cattle and buffaloes¹ as well as horses, camels, sheep and goats. Most of the people are forbidden by their religion to eat meat, otherwise meat-production might be important. The **Punjab** is one of the most productive regions, wheat being the main crop. India's position as a grower and exporter has already been discussed [67]. Cotton is also important, and millet, pulses and considerable silk are produced.

389. The **Ganges** is navigable to the Himalayan foothills, and many great tributaries are also navigable. Its basin is one of the richest and most populous areas in the world. In the upper basin the main winter crops are wheat, barley, maize, pulses and flax, India being the chief source of linseed [112]; while in summer cotton, sugar, rice, indigo,² tobacco and opium are grown. In the lower basin, with its moist heat and annual flooding by the river, rice and jute are the main crops. "Tussur" silk [123] is obtained from the forests. The marshy deltaic jungle, in which the all-useful bamboo, the coconut palm and the mango are prominent, is still infested by wild animals; the clearings provide ideal rice-fields. **Jute** attains its greatest perfection on the sandy banks of the lower Ganges and Brahmaputra, this region enjoying a practical monopoly of production. The regular succession of perfect crops is maintained only by the annual flooding of the rivers—particularly the Brahmaputra—which cover the jute-lands with rich alluvial mud. The fibre is coarse and strong, and peculiarly adapted

¹ Both cattle and buffaloes are largely used in agriculture and transport. ² The former large export has practically vanished through competition from German "synthetic" dyes.

for making "gunny" cloth (widely used for grain-sacks in America). The **Brahmaputra** is navigable to Dibrugarh, below the gorge by which the river descends to the plain of Assam.

390. The **Deccan** includes all peninsular India—mainly a plateau with raised eastern and western edges. The latter, known as the Western Ghats, descends steeply to a very narrow coastal plain, where the rich

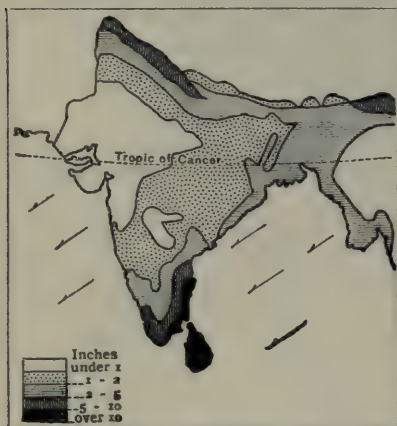


FIG. 59.—INDIA: RAINFALL DURING NORTH-EASTERN MONSOON, OCTOBER TO APRIL.

soil in the moist heat supports a dense population. The plateau slopes gently to the Eastern Ghats, which descend less abruptly to a wider coastal plain. The north-eastern winter monsoons, after crossing the Bay of Bengal, bring a fair rainfall to the Coromandel coast [Fig. 59], where rice again supports a dense population. The unreliable rainfall forces the interior of the plateau to depend upon irrigation except in the north-west, where cotton is grown without its aid over a vast area of so-called "black cotton soil" [102].

391. The natural slope makes most rivers flow east, but the Narbada and the Tapti break westward on either side of the Satpura Hills. None of them are of much use for navigation, rapids marking their descent from the plateau; but, above the rapids, the Narbada is navigable to Jabalpur. Although now pierced by

railways at several points, the Western Ghats form a distinct barrier to communications except where the Palghat Gap offers an easy route inland from Calicut. This fact and the eastward slope of the plateau make it the natural hinterland of Madras.

392. **Cotton** is largely grown in five distinct areas: (a) in the central Deccan from the Kistna to the Kavari; (b) on the black soil of the north-western Deccan from Surat to Nagpur; (c) in the Jamna basin from Jhansi to Delhi; (d) in the Punjab; and (e) in the lower Indus basin (Sind). The crop has been fully discussed elsewhere [102; 104; 108]. The main products of the plateau—after cotton—are wheat, millet and oil-seeds. Tobacco thrives in the Kavari valley, and is grown—with opium—in the north-west between Baroda and Gwalior. Pepper and indigo are important on the east coast, which everywhere bears coconut palms; and eastern deltas yield particularly heavy crops of rice and sugar. Forest clearings on the Nilgiri and Cardamom Hills grow tea and coffee. Dense forests in the lower Narbada and Tapti valleys yield teak, sal and sandal-wood, and much of the highland region north of the Mahanadi is still densely forested and even largely unexplored.

393. **Minerals.**—Few Indian coal-fields are extensive, and most of the coal is unfortunately poor. The chief fields are in (a) north-eastern Assam, now connected by rail with Dibrugarh and Chittagong; and (b) the valley of the Damodar tributary of the Ganges, where Raniganj and Jherria lead in output. The latter field produces the finest coal in the country. Others exist in the Narbada valley, the highlands of Chutia Nagpur and the valley of the Godavari. Petroleum is found in several parts of Assam. Iron seldom exists near good

coal;—a fact detrimental to the development of iron industries [164]. Copper is widely distributed, and lead and silver are found. Manganese is obtained near Nagpur and in Madras, and precious stones in many parts of the Deccan. The gold mines of Mysore are celebrated. Saltpetre is mined near Behar, in western Bengal; and salt is obtained from (a) the Salt Hills, between the Jehlām and the Indus; (b) desert deposits in Rajputana; and (c) the marshy Rann of Cutch, which dries up during the winter months. White marble and red sand-stone are extensively quarried at Jaipur (137,098), the great central salt market.

394. **Industries.**—Most famous ancient hand industries still thrive, though textile fabrics are now largely factory-made. The factory system has obtained a firm footing, and, although mills are limited to a few prominent centres, great further development seems certain. Native labour, if commonly inefficient, is very cheap; coal is now obtainable at reasonable prices; water-power abounds along the slopes of the Himalayas and the Deccan; and raw material is abundantly available. Calcutta and Bombay are the chief industrial centres, the Raniganj coal-field feeding the former. The great jute-mills of Calcutta seriously affect the industry of Dundee, as the cotton-mills of Bombay, Ahmadabad (215,835) and Alwar (56,771)—already numbered by the hundred—threaten that of Lancashire, consuming half of the large crop and supplying eastern markets with yarns and fabrics formerly obtained from England. Silk-weaving mills flourish in Bengal, and woollen manufactures are growing.

395. Paper is made from textile “waste” at Calcutta and Alwar, and there are large flour-mills at Bombay, oil-mills (from seed) at Calcutta, and coconut

oil-mills and sugar-refineries at Madras. There are some tanneries, but the large export of untanned hides and skins and the enormous forest-wealth in tanning-barks suggest a great possible development. Breweries are now important where the climate favours barley and there is a large permanent European population, *e.g.* at "temperate" towns like Bangalur (189,485) and Jabalpur (100,651), mountain sanatoria like Darjiling and Poona (158,856), and military stations like Lucknow (259,798) and Quetta. Mirzapur manufactures varnish, sealing-wax and other commodities from lac, a resin of which India enjoys a monopoly. Tobacco is manufactured at Trichinopoli and Dindigal in south Madras. An important ship-building industry now exists at Bombay, and large iron and steel works have been erected on the Raniganj coal-field.

396. Communications.—Many rivers and irrigation canals, as already mentioned, furnish extensive navigation, and the Buckingham Canal connects the delta of the Godavari with a point between Madras and Pondicherry. Roads are excellent, and the railway system is extensive [Fig. 60]. From Darjiling fairly easy communication with Tibet may be established by one or more passes. The frontier termini at Chaman and Peshawar possess special political importance.

397. Ports.—There are few really good harbours, and the importance of three of the four great ports is due rather to convenience and artificial aid than natural fitness. **Calcutta** (1,222,313), the chief port, has to contend with dangerous currents on the Hugli, and a particularly dangerous bore; and is saved from being silted up only by continual and expensive dredging. It is the largest city in the British Empire after London, and handles more than one-third of the

entire foreign trade, the main exports being jute, opium and tea. It is being rapidly overtaken by **Bombay** (979,445), however, with the finest harbour and a better situation for commerce. Bombay already handles one-third of the foreign trade, and the develop-

ment of cotton-growing and manufacture is continually enhancing its importance.

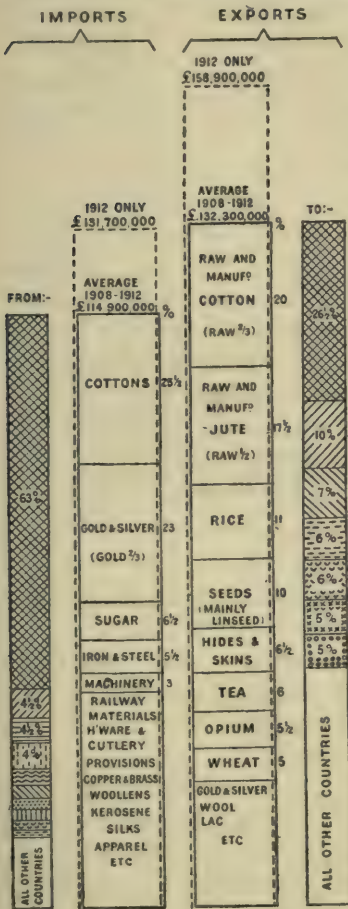
398. **Karachi** (151,903), by the development of the Punjab and the Indus valley, aided by extensive harbour works to neutralise a poor situation, has become the third port,



FIG. 60.—INDIA: CHIEF RAILWAYS AND TOWNS.

cotton and wheat being the chief lines handled; and it is strategically important as communicating direct by rail with the military outposts of Quetta and Peshawar [Fig. 60]. The volume of its trade is about one-third that of Bombay. **Madras** (518,660), with a trade less than half that of Karachi, is the fourth port. Naturally a mere roadstead, it has been given a good artificial

harbour with great difficulty and at enormous expense in view of the extent and richness of its hinterland.



Teak, sugar and coconut products (nuts, copra, oil and fibre) are the main lines handled. The four chief ports transact jointly almost five-sixths of the entire foreign trade, the rest being shared mainly by Masulipatam, Calicut (78,417), Surat and Chittagong. Goa, the Portuguese port, has a good harbour and a fair trade.

399. Foreign Trade.—Of the raw cotton exported [Fig. 61] two-fifths is taken by Japan and only one-sixteenth by Britain, half being shared by Germany, Belgium, Italy and Austria-Hungary. China and Hong-Kong take two-

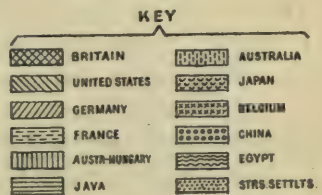


FIG. 61.—INDIA: FOREIGN TRADE.

thirds of the cotton yarns and fabrics. Of the raw jute more than two-fifths comes to Britain and one-

fifth to Germany; while of the "gunny" cloth almost two-fifths is taken by the United States and only one-fifteenth by Britain, the rest going mainly to Argentina and Australasia. The rice is mainly Burmese, and represents but $\frac{1}{200}$ of the crop. The import of cottons is mainly from Britain, as is also most of the iron and steel and machinery. The sugar import—two-thirds from Java and nearly all the rest from Mauritius—satisfies but one-twentieth of the demand, the remainder being home-grown. The entire trade has increased by over 70 per cent. in ten years. **Britain takes from India** mainly wheat, seeds (chiefly linseed), tea, jute, cotton, rice, and most of the small export of tanned hides and skins; and she **sends to India** chiefly cottons, iron and steel goods, machinery and railway plant. Important towns not mentioned are **Haidarabad** (500,623), **Lahore** (228,687), **Benares** (203,804), **Agra** (185,449), **Cawnpur** (178,557), **Allahabad** (171,697) and **Amritsar** (152,756).

CEYLON

Area, 25,332 square miles ($=\frac{5}{8}$ Scotland); population, 1911, 3,592,397 ($=\frac{3}{4}$ Scotland).

400. The climate is uniformly warm, with less moisture in the level north than in the hilly south, where rain is freely obtained from both monsoons. Production is therefore greatest on the southern plains, where the moist heat favours rice and cacao, the cinchona providing shade for the latter (*cf.* § 386). Vast tea plantations cover clearings on the southern slopes. Rubber plantations are rapidly extending, Ceylon being now the chief grower in the Empire; and some tobacco is raised. Cinnamon, nutmeg and other products are obtained from the forests, and coconuts and areca nuts¹

¹ Largely used in the east for chewing.

from shore palms. Black cattle and buffaloes are reared. Coffee, formerly the staple product, has all but vanished through disease; tea and cacao, the latter crop now increasing rapidly, have replaced it. The only important minerals are graphite and precious stones, the island being the world's chief source of the former. Tortoiseshell is obtained on the coast, and pearl-fisheries in the Gulf of Manar yield a fluctuating output.

401. **Trincomali**, an important naval coaling-station, has the finest harbour; but **Colombo** (213,396), with a splendid artificial harbour nearer the productive region and the ocean highway from Europe to the east, conducts nearly all the trade. **Galle**, with an inferior harbour, has a small share. The chief **exports** are tea, coconut products, rubber, graphite, cacao, cinnamon and areca nuts; and the chief **imports** rice (the home yield being insufficient), coal and coke and cottons. **Railways** connect Colombo with Galle and Kandy, the inland native capital; and a line to India has been constructed over "Adam's Bridge," a series of coral reefs crossing the shallow Palk Strait. The northern plain, now forested, contains many ruined irrigation tanks suggesting that it might again become productive.

INDO-CHINA

402. This wide peninsula consists largely of parallel north-and-south mountain ranges separated by important valleys, the mountains rising and converging in the north where the wild and densely-forested Shan States are still practically unexplored. The excessive heat and moisture of the lower valleys and deltas produce exceptionally heavy crops of excellent **rice**. The rivers, when flooded, cover the lowlands with rich alluvial mud; and the Menam even largely determines

the value of the rice-crop by the extent of the flood. Sea, river and lake **fishing** occupies most of the people, rice and fish forming the staple food. **Salt**, obtained everywhere from brine by evaporation, is a valuable preservative, and salt-fish is an important export—particularly from Annam. The tropical forests yield abundant **teak**, Burma and Siam furnishing most of the world's supply, and the cutting—even in Siam—is mainly in British hands. Burmese reserves are said to be inexhaustible with conservation. Other valuable forest products are bamboo, rubber, rattans¹ and dyes. The shores are mostly fringed with bamboos, mangroves, and coconut and areca-nut palms. The cultivation of cotton, tobacco and the mulberry (for silk) is general, the cotton specially in French territory.

403. **Burma**,² the western part, is politically part of the Indian Empire. Effectively isolated by mountains, it consists mainly of three river valleys and deltas—those of the Irawadi, the Salwin and the Sittaung. The first is the largest and most important river of the peninsula. Steamers ascend it for 700 miles to Bhamo, near the Chinese frontier. The Salwin, much obstructed by rapids, is navigable for only 80 miles; the Sittaung merely defines a useful route.

404. **Mineral products** include coal, found in the Irawadi valley, between Mandalay and Bhamo, and in the Chindwin valley; and petroleum, also obtained in the former. The celebrated rubies are found north of **Mandalay** (138,299), and still farther north there are mountain deposits of jade and amber (a fossil resin, now scarce). Tin is important in the hills of Tenas-

¹ The cane of a palm used in furniture-making, and, split into narrow lengths, for basket-work.

² Area, 236,738 square miles (= twice Britain); population, 1911, 12,115,217 (= $\frac{1}{15}$ Britain).

serim. The few industries include silk-weaving, wood-carving and the making of cigars, lacquered basket-work boxes, embossed silverware and gongs. There are rice-husking mills at **Rangoon** (293,316), the chief port, which is accessible to ocean steamers at high tide and handles two-thirds of the foreign trade, rivalling Madras in its tonnage. **Moulmein**, the chief teak port, is kept open for large vessels by dredging. Other ports are Bassein, Mergui and Tavoy, the last two receiving overland a share of the Siamese trade. The chief **exports** are rice (five-sixths of the total value), teak, rubber, petroleum, gold, jade and rubies.

405. In **Siam**¹ teak logs are floated down the Menam to be cut in Bangkok sawmills for export. That river takes small steamers to its confluence with the Me-Ping; the dredging of the bar at the mouth would admit large vessels to Bangkok. The alluvial, irrigated plains produce—beside the usual crops—sugar, sesame, hemp and fruits; while coffee grows on upland clearings and cattle are reared. Slavery, formerly the chief bar to development, has been abolished.

406. The **mineral wealth** is great. North-western mountains contain sapphires and rubies, and round Khorat are rich gold-mines; while coal, iron, zinc and manganese are also found. The Malay Peninsula, the northern half of which is Siamese, is especially rich in tin [169] and contains considerable coal; and its rubber-plantations [134] are of ever-increasing importance. It also yields most spices known to commerce, including pepper. **Ayuthia** is an important river-port collecting teak, bamboo and rice for export—mainly through Bangkok but partly also through the Burmese ports of

¹ Area, about 195,000 square miles (= $1\frac{1}{2}$ times Britain); population, 1910, 8,117,953 (= $1\frac{2}{3}$ Britain).

Moulmein and Tavoy. Boat-building is important at **Bangkok** (628,675), and sugar-refining at Zimme. The chief **exports** are rice (mainly to China and Singapore), teak, fish, hides, silk and pepper ; and the chief **imports** cottons, provisions, silk goods, iron-ware and machinery, gunny bags, sugar, petroleum and opium. Most of the trade is shared by Britain, Hong-Kong and Singapore.

407. **French Indo-China** includes Tong-king, Annam, Cambodia¹ and Cochin-China,² most of the region being still undeveloped. The two last consist mainly of the hot, damp rice and sugar lands of the rich, irrigated Mekong flood-plain and delta, and yield, in addition to the usual products, liquorice, coal, iron, zinc and copper. **Saigon** (64,845), the chief port, with large rice-husking mills, practically monopolises the trade ; **Pnom-Penh** (62,255), the chief inland town, has oil-mills and soap-works. The Mekong delta is very large, and steamers may ascend the river for 300 miles.

408. Annam,³ the most backward as well as the most populous part, is but a strip of coastal plain backed by mountains and incapable of growing much rice, the staple food being therefore fish—fresh and salted. In addition to products already named, spices and sugar are raised, and forest clearings bear tea, coffee and mulberry plantations. The only important ports on a coast made dangerous by frequent typhoons are Tourane, with a good harbour and convenient coal, and Hué (60,611), the capital, with a poor harbour, handling mainly salt and fish. **Tong-king**,⁴ mainly

¹ Area, about 45,000 square miles ($=1\frac{1}{2}$ times Scotland) ; population, 1911, 1,634,252 ($=\frac{1}{3}$ Scotland). ² Area, about 20,000 square miles ($=\frac{2}{3}$ Scotland) ; population, 1911, 3,050,785 ($=\frac{2}{3}$ Scotland). ³ Area, about 52,100 square miles (= England) ; population, 1911, 5,554,822 ($=\frac{7}{8}$ Greater London). ⁴ Area, about 46,400 square miles ($=1\frac{1}{2}$ times Scotland) ; population, 1911, 6,119,720 ($=1\frac{1}{3}$ times Scotland).

the flood-plain and delta of the Song-koi, which takes small steamers to within the Chinese frontier, produces, in addition to the usual commodities, sugar, maize, fruits, manioc (for tapioca), tobacco and cinnamon. There are cotton-mills at Hanoi (136,676), the capital, and at Haiphong, the chief port, near which coal is found. Other industries include silk, sugar and oil-works. The chief **exports** are rice (mainly to Hong-Kong), silk, fish, pepper, hides, cotton and sugar; and the chief **imports** metal goods, cottons and petroleum.

409. The **Straits Settlements**¹ and the **Federated Malay States**² (under British protection) together occupy the southern half of the Malay Peninsula, the former also including the island of Labuan, off north-west Borneo, and the Cocos Islands and Christmas Island in the Indian Ocean. The Peninsula is an important source of spices and pepper, and is exceedingly rich in tin [169]; while guttapercha is produced and rubber plantations [134] are rapidly extending. Of the many good western ports, **Penang** and **Malacca** alone are important. The former has a good harbour and a large tin-smelting industry; but the latter, through silting, has declined in favour of Singapore.

410. **Singapore**, with an unrivalled situation on a land-locked island harbour at the southern end of the Peninsula, is a natural point of call on the route from Europe and India to China and Japan, and is equally convenient for Australia; facts which, along with its central position in an extremely productive archipelago, make it a natural collecting and forwarding centre for trade of all kinds. It possesses large ship-building and

¹ Area, about 1,400 square miles; population, 1911, 714,069.

² Area, about 27,500 square miles ($=\frac{1}{2}$ England); population, 1911, 1,036,999 ($=\frac{1}{7}$ Greater London).

repairing yards, and the largest ships may moor alongside the quays. Tin-smelting is important, that metal furnishing over one-fifth of the total exports. **Labuan**, with a good harbour and convenient coal, is an important coaling station. The chief **exports** are tin, gums, copra, spices, tapioca and sago, gambier, rattans, hides and fruit; and the chief **imports** rice, opium, cotton goods, fish, tobacco, coal, sugar, iron-ware and petroleum. A suggested **ship-canal** across the low Isthmus of Kra would shorten the distance between India and Hong-Kong by over 650 miles, and that between Rangoon and Bangkok by 1,300 miles.

THE EAST INDIES

411. The archipelago has a great aggregate area. Except for the Philippines, now belonging to the United States; north Borneo, which is British; Labuan, politically part of the Straits Settlements; and Timor, which is Portuguese; the entire region is Dutch. Borneo alone is not volcanic; and the rich soil in the tropical heat and moisture bears everywhere a luxuriant vegetation. Typical products are gutta-percha, indiarubber, pepper, rattans, sago (the pith of a palm), coconuts and areca nuts. Coal is mined in Sumatra, Java and Borneo.

412. **Sumatra**¹ presents a steep front to the summer monsoons, the western rainfall being exceptionally heavy; east of the mountain backbone is a broad, flat plain watered by wide, navigable rivers. The main products are tobacco, coffee, pepper and guttapercha. Gold and silver give rise to the fine native filigree

¹ Area, 161,612 square miles ($= 1\frac{1}{3}$ times Britain); population, 1905, about 4,029,503 ($= \frac{1}{11}$ Britain).

industry. Tin is important in the adjoining islands of Banka and Billiton. The chief ports are western Benkulen and Padang, the latter with extensive local coal deposits, and Palembang, about 60 miles up one of the eastern rivers. **Java**¹ is the most populous, highly developed, productive and progressive island, and one of the chief sources of sugar [77], coffee [92] and rubber [134]. Coffee, however, is declining in favour of tea and cinchona (*cf.* Ceylon). Other important products are rice, indigo, maize, tobacco, cotton and cacao. The chief ports are **Batavia** (138,551), the capital of the Dutch Indies, with an excellent harbour commanding traffic through Sunda Strait; Surabaya (150,198), sheltered by fertile Madura, handling mainly sugar; and Samarang (96,600), an exposed roadstead with an important oil industry.

413. Mountainous **Celebes**² is densely forested, only two peninsulas—Macassar and Minahassa—being really occupied. The latter grows mainly coffee and cacao, other products being spices, sea-slugs (esteemed a delicacy in China), tortoiseshell, pearls and Macassar oil. The only prominent ports are Menado, Kema and Macassar. The **Moluccas**³ are also densely forested, the chief products being cloves, nutmeg, mace (the inner covering of the nutmeg) and sago.

414. **Borneo**,⁴ the largest of the East Indies, still

¹ Area (with Madura), 50,554 square miles (= England); population, 1905, 30,098,008 ($=\frac{5}{8}$ England).

² Area, 71,470 square miles ($=2\frac{1}{3}$ times Scotland); population, 1905, about 851,905 ($=\frac{1}{3}$ Scotland).

³ Area, 43,864 square miles ($=\frac{9}{10}$ England); population, 1905, about 407,906 ($=\frac{1}{10}$ England).

⁴ Dutch Borneo, area, 212,737 square miles ($=1\frac{3}{4}$ times Britain); population, 1905, about 1,233,655 ($=\frac{1}{3}$ Britain). British Borneo, area, about 31,106 square miles (= Scotland); population, 1911, 208,183 ($=\frac{2}{3}$ Edinburgh).

mainly undeveloped, contains many radiating mountain ranges between which navigable rivers flow through rich alluvial valleys. All of these rich rice-lands lie in Dutch territory except one tract—the Rejang valley, in Sarawak—which is British. The forests yield timber, rubber, guttapercha, camphor, cutch (a dye extracted from the wood of a tree) and rattans. Besides rice, cultivated products are sugar, sago, pepper, tobacco and coffee; and the shores yield coconuts, sea-slugs and edible birds' nests (the last being also regarded as a delicacy in China). Gold is found, coal occurs frequently near the coast, and diamonds are obtained in British territory. The chief Dutch ports are Banjermassin, with native industries in knife-making and basket-work, and Pontianak, each with a large and rich hinterland. The chief harbours in the British sphere are Sandakan (6,000), in the north-east, and Kuoning, in Sarawak.

415. The **Philippines**¹ were taken by the United States from Spain in 1898. The only island of much importance is Luzon. The main crops are rice, sugar, tobacco and Manilla hemp, a fibre coarser than jute and equally strong. Copra is important, and tropical fruits abundant. Gold, copper, iron and coal are all found. **Manilla** (234,409), the capital and chief port, has cigar, cheroot, sugar and distilling industries; and a new harbour, to cope with the large and growing trade, is being constructed. The islands are liable to damage from typhoons.

¹ Area, about 127,853 square miles (= Britain); population, 1911, about 8,368,427 (= $\frac{1}{11}$ Britain).

QUESTIONS

49. Contrast the Hwangho and the Yangtse.
50. China's mineral wealth is great, yet her industries are few. Account for this.
51. Show how Hankau benefits and is likely to benefit still further by natural advantages of situation.
52. Write a short essay on The Future of China.
53. Wheat is a summer crop in the west of Honshiu, and a winter crop in the east. Why?
54. What is deforestation? How has it affected Japan, and what remedial measures are being taken?
55. Write a short account of Formosa.
56. Describe the importance of Manchuria to China, and of Korea to Japan.
57. What would be the climate of India if the Himalayan mountain barrier did not exist? Give full reasons for your ideas.
58. Where are the Khaibar and Bolan Passes? Explain their importance. Is the Dzungarian Gate equally important?
59. Was the enormous expense, necessary to convert Karachi into a good port, justified?
60. It has been said that the suggested ship-canal across the Isthmus of Kra would seriously affect the trade of Singapore. What is your opinion?

CHAPTER VI

AUSTRALASIA

THE COMMONWEALTH OF AUSTRALIA

Area, 2,974,581 square miles ($=\frac{2}{3}$ Europe); population, 1911, 4,455,005 ($=\frac{1}{10}$ Britain).

416. AUSTRALIA is mainly a plateau with a raised eastern edge closely following the direction of the coast-line [Fig. 62]. Behind the eastern mountains a great circular depression is practically bisected by an elevation extending, with a short break, from near Adelaide to central Queensland. The south-eastern section is drained by the Murray-Darling river system into the southern ocean; the north-western by rivers feeding shallow, salt Lake Eyre, some forty feet below sea-level. The continent is almost bisected by the southern tropic, stretching (with Tasmania) from the equivalent of the latitude of the Pyrenees to that of the Sudan. There is thus a wide range of temperature characterised mainly by warmth [Fig. 63], although the greater oceanic area tends to keep the temperature lower, latitude for latitude, than that experienced in most of the comparable parts of the northern hemisphere.

417. The rainfall [Fig. 64] depends mainly on Trades and Anti-Trades, which fewer land obstructions enable to blow more steadily than in the northern hemisphere.

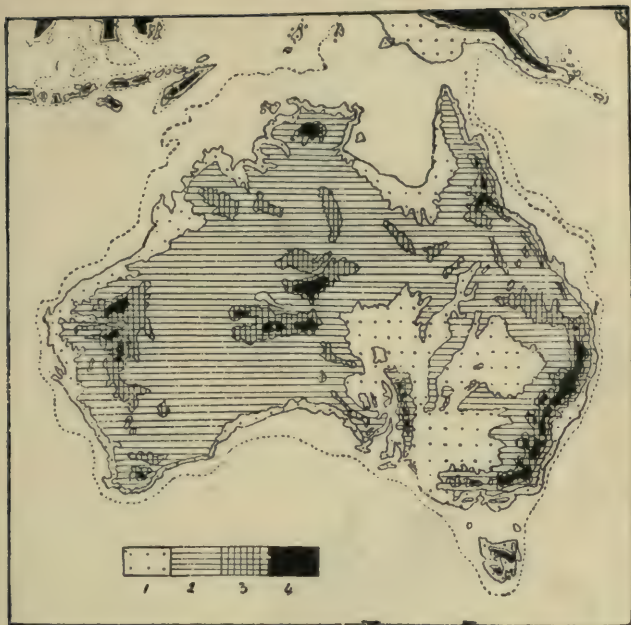
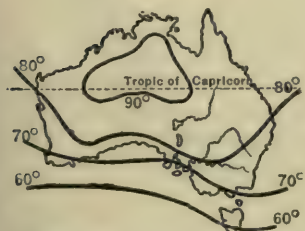


FIG. 62.—AUSTRALIA : OROGRAPHICAL. (After the Diagram Co.)

1, Under 600 feet high ; 2, 600–1,500 ; 3, 1,500–3,000 ; 4, over 3,000 ;
 , hundred-fathom line.

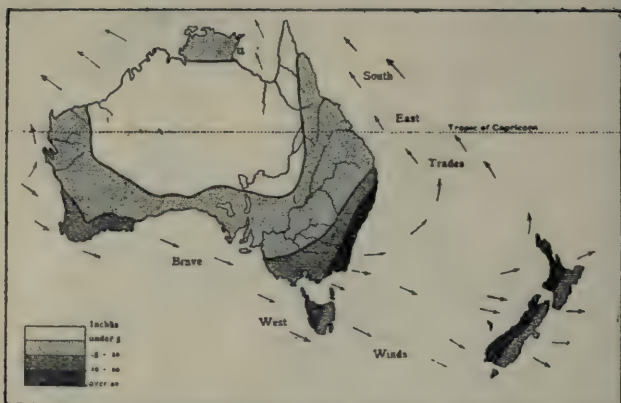


JANUARY ISOTHERMS REDUCED
 TO SEA-LEVEL.

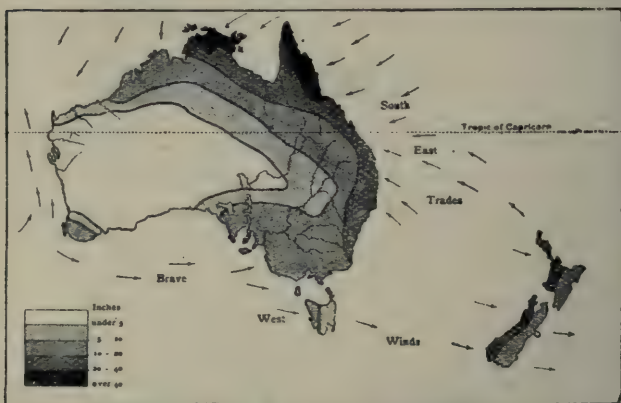


JULY ISOTHERMS REDUCED TO
 SEA-LEVEL.

FIG. 63.



AUSTRALIA AND NEW ZEALAND: WINTER RAINFALL, MAY TO OCTOBER.



AUSTRALIA AND NEW ZEALAND: SUMMER RAINFALL, NOVEMBER TO APRIL.

FIG. 64.

The former bring rain at all seasons to mountainous eastern New South Wales, but the rainfall rapidly decreases as they pass inland, and becomes quite

unreliable and rarely of much account west of the Darling River. In Queensland the Trades blow *along* the coast, bringing rains only in summer when the heated interior draws them inland over the mountains. This indraught affects the whole northern region, to which hot, moisture-laden winds are drawn southward from the equator; and the resulting summer rainfall, heaviest in Arnhem Land, reaches southward in ever-diminishing volume over much of the interior, which is rainless during other seasons.

418. The Anti-Trades, on the other hand, take their origin sufficiently far north to strike Australia only in winter, when they bring a fair rainfall to west and south coasts from Shark's Bay to Victoria, and particularly to the Albany Peninsula, the coast of South Australia and most of Victoria. Tasmania has a good rainfall at all seasons. The climate of the south and south-west being thus essentially "Mediterranean," most Mediterranean products, especially fruits, are raised; and the wide range of climatic conditions elsewhere points to a corresponding variety of production.

419. **Natural vegetation**, except where the rainfall is adequate, is of little importance [Fig. 65]. Tropical forests line the northern shores behind a wide fringe of mangroves, forests elsewhere being limited to eastern and southern seaward mountain slopes, Southern Australian peninsulas, and the Albany Peninsula of Western Australia. Hard woods—mainly eucalypti—predominate, Australia being remarkably deficient in useful soft woods [142], which are therefore imported for building purposes. Jarrah and karri, hard red woods largely used for street paving, railway sleepers, etc., cover almost 40,000 square miles of the Albany Peninsula east of the Darling Range. Fine cabinet woods and

tanning-barks abound in New South Wales and southern Queensland. The landward slopes of the eastern mountains descend to a wide pastoral belt, which merges farther west through poor steppe land [323] into the desert interior. Northern tropical forests

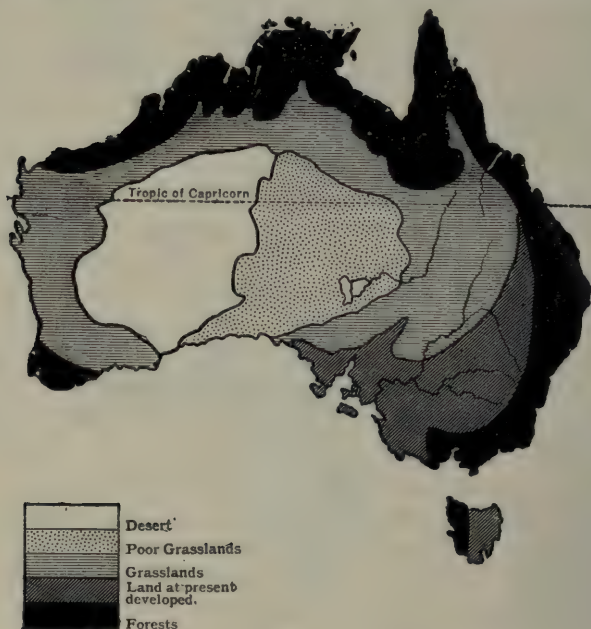


FIG. 65.—AUSTRALIA: VEGETATION.

fade southward into good grazing-lands reaching about 500 miles into the interior, and a wide seaward belt of Western Australia also bears fair pasture. Most of the interior, receiving a less annual rainfall than 10 inches, consists of poor grass-land or desert bearing patches of spinifex, or prickly grass, and salt-bush, the latter—containing stored moisture—being a useful sheep-food.

420. The Pacific **rivers**, owing to the proximity of mountains to the coast, are mostly short, rapid, liable to floods and obstructed by bars; and most other rivers suffer more or less from drought. The **Murray-Darling** system is the only natural means of inland navigation; but, while at times flooded, the rivers are frequently too low to be useful. When normal the Murray may be navigated for about 1,700 miles to Albury, the Murrumbidgee for about 600 miles, and the Darling for 1,000 miles; the construction of locks would render them always navigable, and the dredging of a bad bar at the mouth of the Murray would admit sea-going steamers. Lake Eyre rivers all suffer from drought, Cooper's Creek, for example, being at one time quite dry and at another a magnificent stream two miles wide and twenty feet deep.

421. The **coast-line** is regular, and almost unbroken except on the east and the north-west, but there are several useful bays elsewhere. Port Darwin is the finest on the north. The west coast is low and sandy, and the only harbour on the cliff-lined western half of the south coast is that of Albany. A rich hinterland and convenient coal lend the many fine eastern harbours special importance.

422. **Wool** is the outstanding product, Australia being the chief source [Fig. 23]. All but a fraction of the enormous output is exported. Britain takes almost half and France about one-fourth, Germany and Belgium sharing nearly all the rest. The best sheep lands have an average annual rainfall between 10 and 20 inches and a steady average temperature. Reference to maps shows that these conditions apply to a wide curved belt extending from mid-Queensland through New South Wales and Victoria into southern South

Australia, and to part of the Albany Peninsula ; and that the largest area lies in **New South Wales**. The finest Australian merino comes from the Riverina district of that state—between the Murray and Darling rivers—and similar land south of the Murray in Victoria, the dry, temperate climate, saline soil and fine grass conducing specially to quality. The greater heat and moisture of Queensland render the fibre coarser except on the Darling Downs, where elevation counteracts the warmth. The salt-bush west of the Darling also produces a coarser merino, while richer seaward grazings produce better mutton than wool.

423. **Cattle** yield the best milk in “sheep” regions, tropical grazings from Queensland to Kimberley (Western Australia) producing the best beef. **Dairy-ing** industries, producing butter, cheese and condensed milk, are rapidly growing in the eastern states, but their output—except in butter—is insufficient for the home demand. Butter exports are rapidly growing under the influence of co-operative manufacture [151] and government grading [152]. Hides and skins, in an animal-rearing land, are naturally an important trade item ; and almost half the Australian export goes to Britain. The **meat** export has already been shown [Fig. 27]. Britain takes all but 5 per cent. of the mutton and all but 25 per cent. of the meat. The South African demand fell between 1905 and 1909 from 45,000,000 pounds of mutton and meat to little over 4,000,000 (*cf.* Fig. 29) ; but the British demand rose simultaneously from 65,000,000 to 163,000,000.

424. **Wheat** production and export have been discussed elsewhere [64-5 ; 67]. Most of the Australasian output is obtained in Australia, where New South Wales, Victoria and South Australia share almost equally most

of the 6,000,000 acres devoted to it,¹ accounting jointly for about 90 per cent. of the total crop. Britain takes three-fourths of the export, and South Africa one-eighth. **Oats, maize and barley** are unimportant as yet compared with wheat. Oats have sometimes, and maize and barley usually, to be imported to meet the home demand. Production will doubtless remain deficient till the land is more fully settled and the population much larger.

425. The chief drawbacks to agriculture are intermittent droughts and the ravages of rabbits. The latter, introduced from Britain in 1788, have so seriously overrun the eastern states as to menace production; and, despite thousands of miles of costly rabbit-proof fencing, they appear to be still encroaching on protected lands. **Droughts**, although losing their terrors with the development of irrigation and the sinking of artesian wells [273], are still disastrous alike to crops and stock. In the great drought of 1902, assisted by the ravages of disease, the number of cattle and sheep in Queensland fell by more than 60 per cent., the loss in New South Wales being somewhat less; while the Queensland wheat crop was an utter failure, those of New South Wales and Victoria being respectively but 14 per cent. and 60 per cent. of the normal.

426. There are several large artesian areas, but the most important is that known as the **Great Australian Artesian Basin**, covering considerably over half a million square miles in western Queensland, north-western New South Wales, north-eastern South Australia, and the south-eastern corner of the Northern Territory. The area of "intake," where the rain has

¹ The entire area of cultivated lands in the Commonwealth is but 11,000,000 acres, or $\frac{1}{4}\%$ of the total.

access to the porous strata [Fig. 45], lies on the slopes of the Great Dividing Range with its heavy summer rains. Almost 2,000 wells have been sunk, but, as this means only one well in each 300 square miles, there is room for an enormous increase. Some of the water is suitable for irrigation, but its main use will be for the watering of live-stock; and, as most of the basin is grazing-land, much of it bearing salt-bush, the tapping of the water should bring vacant land into use besides minimising the risk of disaster from drought.

427. **Irrigation** is most vital where populous and arid regions meet, and large areas have been rendered productive near rivers in drier parts of the eastern states, the rich fruit regions of **Mildura** in Victoria and **Renmark** in South Australia having been created by irrigation from the Murray. Many great schemes are contemplated, and one in particular, now almost completed, calls for special mention. A great dam—the Burrinjuck—is being built across a gap through which the Murrumbidgee flows and, rivalling the great Nile dam at Aswan, will ensure a perennial supply of water for irrigating lands even 200 miles farther west, making productive over 2,000 square miles of land now barren. The extension of the system across to the Murray would reclaim 8,000 additional square miles. Dry farming [24], which does not appear to have been seriously tried, might avail where irrigation is impossible.

428. **Fruit** thrives in most parts where the moisture is sufficient. Temperate varieties, notably the apple, are prolific in Tasmania, and on the southern mainland where also “Mediterranean” fruits are grown; while in Queensland, besides the latter, tropical and sub-tropical kinds, particularly the banana and the pineapple, flourish. Victoria leads with almost one-third of the

fruit-lands, New South Wales following with one-fourth. Fruit-culture is stationary in Queensland and declining in New South Wales; elsewhere it is extending. Exports—mainly fresh—only slightly exceed in value the imports—mainly dried. **Wine** is most important in Victoria and South Australia, which between them own about three-fourths of the vineyards. The latter state leads both in quantity and quality, the irrigated Renmark district having the finest vineyards. Farther east, the irrigated Mildura vineyards enjoy a similar reputation. The growth of production is hindered by the lack of local markets, the Australians not being wine-drinkers, and by competition in distant markets with older and better known wines; but the industry is not declining.

429. **Sugar** is produced from cane in Queensland and northern New South Wales, 90 per cent. of the production taking place in the greater heat of the former. The output of the latter state is declining. A persistent fall in the sugar-yield per acre seems to indicate a gradual soil-exhaustion which a scientific study of the conditions might check. Black labour on the plantations is rapidly disappearing [445], and a State bounty [83] is granted in aid of the extra cost involved in the employment of white labour. Production seemed to reach its highest in 1907, when the export exceeded the import; normally the net import is large. Tobacco, grown in the eastern states, is poor, and production is declining through lack of demand. Cotton is still in the experimental stage, but many parts of Queensland appear to be suitable.

430. **Mineral production** is great [Fig. 66], yet exploitation is still in its infancy; the wide distribution and variety of products suggest that the aggregate mineral wealth is fabulous. **Gold** stands easily first,

Australia being the third source [Fig. 36]; and Western Australia accounts for half the output, the chief fields being those of Coolgardie, Kalgurli and Murchison. Victoria, though yielding less than half as much, has

been producing much longer; her most famous fields are those of Bendigo and Ballarat. In Queensland, whose yield is two-thirds that of Victoria, the chief mines are at Charters Towers, Mount Morgan and Gympie. New South Wales and Tasmania yield less.

431. **Coal** follows gold in value, all but one-tenth being mined in New South Wales round **Sydney**, where the field covers practically 25,000 square miles and is said to contain more coal than all the mines of Britain. Good coal is also found at Ashford, in the north of the state, and near Cooktown and Townsville in north Queensland, and Ipswich and Gympie near Brisbane; while a large undeveloped field has been located in the Dawson-Mackenzie basin inland from Rockhampton. A rich mine at Fingal supplies most of the Tasmanian demand. Deposits elsewhere are poor, but important for local use.

432. **Copper** comes third in importance. One-third of the output is mined in Queensland, near Herberton and Mount Morgan and at Cloncurry; one-fourth in Tasmania, mainly at Mount Lyell; and the rest in New South Wales, at the celebrated Cobar mines; in South Australia, at Wallaroo and Moonta; and in Western Australia, at Northampton.

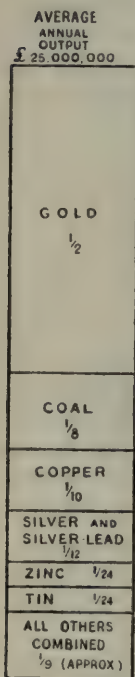


FIG. 66.—AUSTRALIAN MINERAL OUTPUT.

Four-fifths of the output of **silver and silver-lead** is raised in New South Wales, mainly in the celebrated **Broken Hill** district. Smaller quantities are obtained in Tasmania, Queensland and Western Australia. Zinc is mined exclusively in the Broken Hill district. Of the tin almost half comes from the Tasmanian Mount Bischoff mines; one-fourth is obtained in Queensland, round Herberton and Stanthorpe; and one-fifth in New South Wales, round Inverell and Tamworth.

433. **Iron** is produced commercially only in New South Wales, where the richest known deposits exist near Orange, and, therefore, near the great coal-field. There are also other valuable deposits in the state. Western Australia is rich in ore, useless meantime because inaccessible; and both South Australia and Queensland own extensive deposits at present used only as a "flux" in the refining of gold and copper. Considerable wealth also exists in Victoria. The extensive reserves of Tasmania are, unfortunately, impure. The relatively small commercial product of the Commonwealth is rendered possible only by the aid of bounties; but the ever-increasing demand for iron goods may point to a future large-scale production without State aid.

434. **Other products** are naturally numerous and varied. Excellent horses are raised, climatic and other conditions being eminently suitable; and, although 80 per cent. of the animals are found in the east, other states are developing the industry. Most of the declining export goes to India for military use. Ostrich-farming is extending in New South Wales, where the birds seem to thrive even better than in South Africa. Fisheries off the coast should prove valuable when properly developed; at present they are comparatively little drawn upon, and fish is dear. The sugar-beet,

now grown in the Gippsland district of Victoria and at Mount Gambier in South Australia, ought to do well. Coral and sponges are found along the tropical northern shores, and pearls and pearlshell at various points,—particularly in Shark's Bay and Port Darwin.

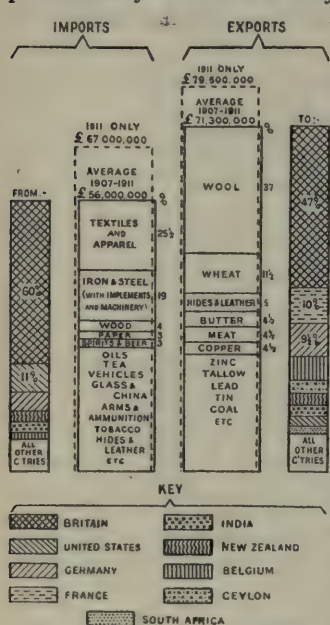


FIG. 67.—AUSTRALIA: FOREIGN TRADE.

435. **Foreign trade** has almost doubled within twelve years [Fig. 67]. Over one-third of the export to Britain is wool, a similar proportion consisting almost equally of wheat, butter and meats; and skins, furs and copper follow. Almost one-fourth of the import from Britain is textiles and wearing apparel, and one-fifth iron and steel goods and machinery.

436. **Railways.**—The eastern mountains, offering a serious obstacle, are now surmounted by several railways to productive inland centres [Fig. 68]. The system is naturally most extensive in Victoria, where

the population is most dense. Unfortunately inter-state jealousies led to the adoption of different gauges—impeding inter-state traffic; but uniformity is now assured.

437. **Queensland; ¹ Industries and Towns.**—Maize-

¹ Area, 670,500 square miles (=5½ times Britain); population, 1911, 605,813 (=⅓ Liverpool).

crops, two of which are raised annually between Brisbane and Rockhampton, support a corn-flour industry and furnish a dairy-food. The best sugar-lands are near Herberton, and round Townsville, Mackay and Bundaberg, where sugar-refining is important. **Bowen**

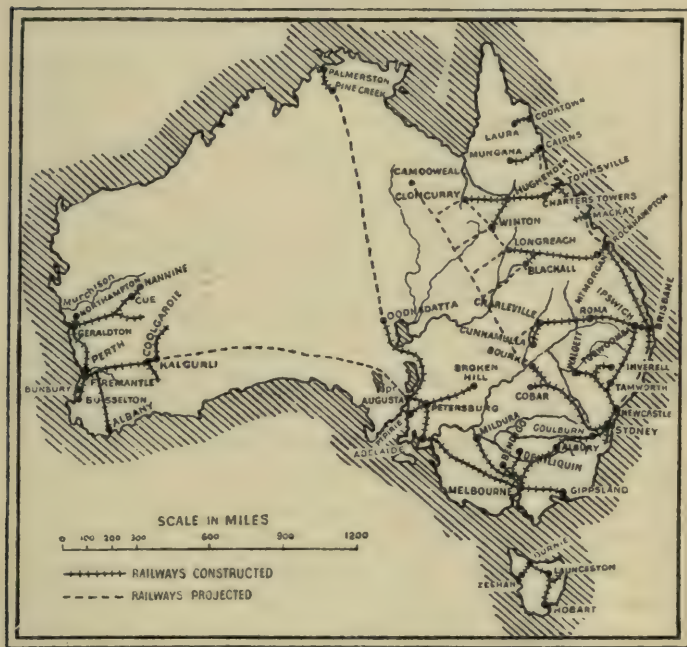


FIG. 68.—AUSTRALIA : CHIEF RAILWAYS AND TOWNS.

has the best harbour and, when linked up with the railways, will be a busy port. **Brisbane** (143,514), the capital, accessible to large vessels, exports the coal of **Ipswich** (25,000) and Gympie, the gold of Gympie, and the wool of Charleville, Cunnamulla and other centres. **Rockhampton** (20,915) ships the cattle of Longreach

and Blackall and the gold and copper of Mount Morgan; **Townsville** (13,835) handles cattle from Hughenden and Winton, copper from Cloncurry and gold from **Charters Towers** (17,298); **Cairns** deals with local bananas and sugar, and copper and tin from Herberton; and **Cooktown** and **Mackay** ship sugar and rice, the Mackay refineries being the largest. **Toowoomba** (24,200) and **Roma** are prominent wine centres.

438. **New South Wales**;¹ **Industries and Towns.**—**Newcastle** (55,380), the greatest coal-port in the southern hemisphere, handles also wine from the warm, dry Hunter valley and tin from Tamworth and Inverell. **Sydney** (636,353), the capital, with about 100 miles of frontage on the unrivalled harbour of Port Jackson, amid one of the world's great coal-fields with good iron conveniently near at Orange, is already one of the leading cities in the southern hemisphere. Agricultural machinery is naturally a prominent steel product. The port draws wheat from the famous Hawkesbury Vale and the tableland round Bathurst, wool from **Bourke** and **Goulburn** (10,023), copper from Cobar, and wine, raisins and fruit from warm, dry **Albury**. Important woollen, leather and furniture industries derive raw material from pastures and upland forests. Bulli, Wollongong and Illawarra are all large coal-ports, and fine local iron ore supplies the foundries of **Illawarra**. **Lithgow** and orange-growing **Parramatta** (12,465) have also important iron-works. Sugar-refineries north of Sydney consume home-grown and imported Queensland cane, and soap and candle works use tallow from the pastures. **Deniliquin**, the chief Riverina wool-collecting centre, finds a more con-

¹ Area, 310,372 square miles (= $2\frac{1}{2}$ times Britain); population, 1911, 1,648,448 (= $\frac{1}{3}$ Scotland).

venient outlet meantime by rail to Melbourne; while **Broken Hill** (30,972) silver and zinc travel to the smelting-works and export-sheds of Port Pirie.

439. **Victoria**; ¹ **Industries and Towns.**—Dairying is the chief industry, co-operative methods being universal. Wheat-lands are being converted into more profitable vineyards for raisins and wine. Agricultural machinery is made at most large towns; and at **Geelong** (28,518), with its moist air and convenient wool, there is an important woollen industry. **Melbourne** (600,160), the capital, stands on the Yarra, which flows into Port Phillip, a vast, shallow bay with good anchorage. Steamers of 8,000 tons can reach the heart of the city, the two outports—Port Melbourne and Williamstown—accommodating larger vessels. The port handles nine-tenths of the foreign trade of the State, and large quantities of New South Wales wool from Deniliquin; and draws coal from Western Point, gold from **Bendigo** (39,417) and **Ballarat** (42,403), and fruit and wine from Mildura and Ararat, the latter a rich irrigated district formerly desert. The richer grazing and beet-refuse [81] of Gippsland favour stock-rearing.

440. **South Australia**; ² **Industries and Towns.**—The harbour of **Adelaide** (192,429), the capital, may be entered by the largest vessels in any weather. Its agricultural hinterland, including the rich Renmark region, is extensive and valuable. Rich gold discoveries are reported about 200 miles to the north-east. Having railway connection with the other eastern capitals and being much nearer to Europe, Adelaide has a large special mail and passenger traffic. It is connected by

¹ Area, 87,884 square miles ($=\frac{3}{4}$ Britain); population, 1911, 1,315,551 ($=\frac{2}{3}$ Scotland). ² Area, 380,070 square miles ($=3\frac{1}{2}$ times Britain); population, 1911, 408,558 ($=\frac{1}{3}$ Birmingham).

telegraph *via* Oodnadatta with Palmerston, where oceanic cables from the Old World reach Australia. **Port Pirie**, **Port Augusta**, and **Port Lincoln** are all busy wheat ports; and the first smelts and exports Broken Hill silver and zinc. Port Augusta draws coal from Leigh's Creek, and wool from a vast western pastoral hinterland. Burra Burra is an important copper-mining centre, and at **Wallaroo** and **Moonta** are the largest Australian copper-smelting works. Some of the ore is sent to be smelted at Newcastle, coal for the furnaces being brought in return. Agriculture is developing round Lake Eyre by the aid of artesian wells, and vast unsettled areas might be irrigated from the many interior rivers, some of which are absorbed before reaching the lakes (*cf.* Russian Turkistan). The gold, copper and tin of **Pine Creek** (in the Northern Territory ¹) are exported from **Palmerston**.

441. **Western Australia**; ² **Industries and Towns**.—Although mainly associated with gold, the State is potentially productive in many other directions. Cattle-raising and tropical agriculture should become important in the north. The cattle of Kimberley are already famed, and the 1,000-mile stock-route to southern markets is well supplied with wells. The trade has increased tenfold in 21 years. The wide western pastoral belt is being gradually utilised, the number of sheep having recently doubled. Fine horses are raised in the moister south-west. In many parts, at present barren, wheat and fruit might be raised by dry farming or irrigation. Wheat is already important round Perth, the acreage having increased tenfold in

¹ Area, 523,620 square miles (=4½ times Britain); population, 1911, 3,310. ² Area, 975,920 square miles (=8 times Britain); population, 1911, 282,114 (=Bradford).

ten years; and the state is now a rapidly-increasing exporter. The Mediterranean climate of the Albany Peninsula specially favours fruit and the vine. The area under cultivation, now over 20,000 acres, is extending more rapidly than elsewhere, the fruit maturing earlier and the orchards being several days nearer Europe.

442. Albany timber exports are handled at **Busselton** and **Bunbury**, the latter also exporting Collie River coal and tin. **Albany** (3,586) is the only southern port. **Geraldton**, with a large pastoral hinterland, is the port for Murchison gold and Northampton lead and copper. The Coolgardie-Kalgurli gold-field, formerly a desert waste, now boasts several large towns whose water-supply is specially pumped 350 miles from **Perth**,¹ the capital. That city is accessible by both river and rail from **Fremantle**, whose rapidly increasing trade demands a greatly increased quay accommodation.

443. **Tasmania**; ² **Industries and Towns.** — The general slope of the mountainous tableland is eastward, towards open alluvial plains providing excellent grazing and arable land. The climate, though warmer, approximates to that of England, English products thriving even better than in the "Old Country." Sheep-rearing and fruit-growing are the chief occupations, apple-orchards regularly yielding 100 bushels of particularly fine fruit per acre. Fisheries are also valuable. Mountains, especially in the west, are heavily timbered and rich in minerals. Coal is plentiful at Fingal, and in the Derwent basin; it is also found at western Latrobe, with oil-shale. Good harbours abound, the best being the Tamar estuary, Macquarie Harbour, and the Derwent estuary where **Hobart** (38,391), the capital,

¹ Population, with Fremantle and suburbs, 106,792. ² Area, 26,215 square miles ($\frac{1}{2}$ Ireland); population, 1911, 191,211 ($=\frac{1}{2}$ Dublin).

makes jam from eastern fruits. **Launceston** (23,726), at the head of navigation on the Tamar, smelts tin and exports wool, **Macquarie** smelting the celebrated Mount Lyell copper. The development of hydro - electric machinery has drawn attention to the enormous water-power, and a scheme now being carried out will utilise the outflow from the central Great Lake, giving a drop of 1,000 feet. It is estimated that almost 100,000 horse-power might be "harnessed." The industrial possibilities of this are great, as a 78-mile radius [43] would include practically the whole island.

444. **The Future.** — Industries are developing steadily, aided by a protective tariff [31]. Agricultural machinery and ship-building are becoming prominent, flour-mills and breweries exist in most large towns, and woollen industries are sure to become important in the wool-raising east, where coal is plentiful and the climate is sufficiently moist. Wine-production, stock-raising and grain-growing also give great promise. Apart from such developments the future is largely a question of federal policy. The greater convenience of Canada for the "Old Country" doubtless largely explains the **low rate of immigration**.

445. The development of tropical agriculture in the north cannot be accomplished by white labour; so that the policy of a "**White Australia**," prohibiting coloured immigration, shuts out the only form of labour by which vast northern lands might be developed — under "white" supervision. **Inter-state jealousies**, already referred to [436], have hindered the spending of Commonwealth funds on railways and other schemes which might conceivably benefit one state more than another; but a wider outlook is now prevailing.

NEW ZEALAND

Area, 104,751 square miles ($=\frac{1}{8}$ Britain); population, 1911, 1,008,468 ($=\frac{1}{16}$ Britain).

446. To New Zealand belong several groups of Pacific islands, *e.g.*, the uninhabited Aucklands, the Chathams and the Cook Islands. Of the three main islands constituting the Dominion, North Island and South Island alone are commercially important. The mountain backbone of South Island so closely approaches the west coast that western rivers are mere mountain torrents. The more irregular mountain system of North Island contains still active volcanoes, its scenery and geysers attracting tourists from every land. The rich, volcanic lowlands are crossed by glacier-fed rivers flowing seaward over shallow, silt-covered beds and blocked by bars; there is thus practically no inland navigation except on the Waikato, which is negotiated by shallow-draft steamers. The latitude corresponds to that of the Mediterranean in the northern hemisphere, but the tempering oceanic influence renders the climate similar to that of England, though somewhat warmer and sunnier (*cf.* Tasmania). English products thus thrive.

447. South Island, owing to the latitude, the mountains and the steadiness of the Anti-Tradewinds, receives regular and heavy rains at all seasons [Fig. 64], whence the dense western forest-growth. Only in winter do the Anti-Tradewinds blow sufficiently far north to cover North Island, whose climate is therefore almost Mediterranean, although by no means rainless in summer. The chief productive area is the **Canterbury Plain** in South Island, where the mountain shelter enables the rich soil in the dry warmth to

support many millions of sheep and cattle and grow heavy crops of the finest wheat [65]. **Sheep-rearing** is the outstanding industry, especially on the Canterbury Plain. Very fine wool and excellent mutton are produced. **Agriculture** follows sheep-rearing, wheat and oats being the chief crops—mainly again on the Canterbury Plain.

448. **Dairying** is naturally important, co-operative production being highly developed; over 250 butter and cheese factories furnish a large export [Fig. 30]. In ten recent years the cheese export increased sixfold while that of butter doubled. "New Zealand" flax (phormium) is important in the Waikato valley. The chief forest product of North Island is the kauri pine in Auckland, yielding not only fine timber, but a gum much used in the preparation of varnish. South Island yields valuable timbers; and fine tanning-barks, some of which are exported to France for use in the kid-glove industry, are common in both islands.

449. The only important **minerals** are gold and coal. Gold is found chiefly in the Thames valley in North Island, and in South Island from Hokitika to Nelson and in the basins of southern



FIG. 69. — NEW ZEALAND: CHIEF RAILWAYS AND TOWNS.

rivers—notably the Clutha. Coal abounds in many districts, and is generally near the surface and easily and cheaply worked. The chief production at present is in the Waikato valley and the north-eastern promontory of North Island; in the north-west of South Island, Greymouth and Westport exporting; and round Dunedin. **Manufactures** are growing under the double stimulus of a high protective tariff and cheap coal.

450. **Railways and Towns.**—**Auckland** (102,676), the largest city, on a narrow isthmus in North Island, is the fortunate possessor of two harbours; but the western is too shallow for large vessels. **Wellington** (70,729) is the capital. **Christchurch** (80,193), the second city, with its outpost of Lyttelton, has for its hinterland the whole of the Canterbury Plain; and its important industries include mutton - freezing, dairying, tanning, woollen manufactures and flour-milling. **Dunedin** (64,237), with its outpost, Port Chalmers, is the chief gold port; and abundance of convenient coal fosters a large machinery industry — particularly for woollen manufacture. **Oamaru** is a great wheat-port, and **Timaru** (11,280) deals specially with frozen meats. **Invercargill** (15,858) with its outpost is the southern railway terminus [Fig. 69].

451. **Foreign Trade.**—The British share of the exports [Fig. 70] is mainly wool, mutton and butter; and Britain supplies most of the chief imports.

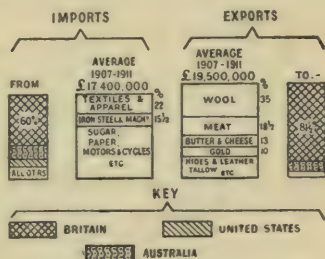


FIG. 70.—NEW ZEALAND :
FOREIGN TRADE.

NEW GUINEA

452. After Borneo, New Guinea is the largest island in the world. As it lies between the equator and 10° south, the climate, naturally hot and wet, is made wetter in the southern summer by monsoons which then cross the island *en route* for Australia [417]. Practically the whole island is densely clothed with tropical forests, which fact, aided by the difficult, mountainous character of the interior, explains the paucity of our knowledge regarding it. The lowlands, alluvial and unhealthy for Europeans, are crossed by navigable rivers—*e.g.*, the Fly River and the Kaiserin Augusta.

453. The Melanesian natives (of Negro stock) are particularly indolent, and cannot be induced to work beyond raising for their own use typical commodities like yams and other edible roots, and fishing. Javanese and Chinese labour has been introduced; but the labour difficulty must operate seriously against the development of a land naturally so rich. The western Dutch region has the best harbours and is nearest the Old World; but at present these advantages, in view of the difficulties to be overcome, count for little. The chief Dutch trade is naturally with the Malay Archipelago. That of the British region is mainly with Queensland and New South Wales, **Port Moresby**, with an excellent harbour, being the centre. The comparatively insignificant **exports** of the island include copra and pearls.

MELANESIA

454. Under this name are included many groups of islands east of New Guinea and Australia following a line more or less parallel with the Australian coast and

inhabited by Melanesians. The products are mostly similar to those of New Guinea. **New Caledonia**, the French penal settlement, with a fine climate and rich, volcanic soil, has great and varied mineral wealth and is the chief source of nickel and cobalt. Cattle and sheep are reared, and coffee is exported from the capital, Noumea. The **New Hebrides**, jointly controlled by Britain and France, are mountainous, wooded and fertile. Yams, bread-fruit and bananas are typical products, forming the staple diet. Copra is exported to Marseilles. The islands have suffered much through being exploited for labour for the sugar plantations of Queensland.

POLYNESIA

455. This designation includes all Pacific islands outside of Melanesia, the inhabitants being, like the New Zealand Maoris, of Malay stock, and both intelligent and energetic. The islands, as a rule, are either high and volcanic with rich lowlands, or of coral formation. The coconut palm grows everywhere, and products generally are similar to those of the Melanesian system. Britain and the United States are the chief controlling powers. The **Fiji Islands** are British. The two main islands are volcanic and fertile, the products being similar to those of the New Hebrides with the addition of fruits and maize, of which grain two or three crops are regularly raised in the year. Indian coolies supplement native labour in the sugar plantations. Suva, the capital, and Levuka have both good harbours and important distilleries. The trade is almost entirely with Australasia and Britain, the chief **imports** being cottons, machinery, hardware and

foodstuffs. The islands, unfortunately subject to violent cyclones, are a natural calling-place for trans-oceanic steamers. The **Hawaiian Islands** belong to the United States, conditions and products being similar to those of Fiji. Sugar, of which the islands are one of the chief sources [Fig. 13], and rice predominate, the uplands yielding good coffee and supporting many sheep and cattle. **Honolulu**, the capital, is an important calling-place for trans-oceanic steamers.

QUESTIONS

61. What is meant by a "Mediterranean" climate? To what are its distinctive characteristics due?

62. Account for the desert of central Australia.

63. Ascertain the density of the population in the various states of the Commonwealth of Australia, accounting for the differences shown.

64. Queensland possesses practically half the cattle and New South Wales half the sheep in the Commonwealth. Explain why.

65. Explain fully what is meant by a "co-operative" butter factory. What are the advantages of this form of production?

66. Which state in the Commonwealth produces most wheat for its area? Which most for its population? Which should be the chief exporting state?

67. Describe fully the principle of an artesian well.

68. Might Palmerston ever become commercially important? Give reasons for your answer.

69. How far would it be by rail from Perth to Adelaide? (See Fig. 68.) Assuming that an average daily run at sea is 400 miles and that a train would

perform the journey at an average rate of 40 miles per hour, what saving in time would the railway effect on a trip between the two cities ?

70. Give a brief description of the natural vegetation of New Zealand, assigning causes where you can.

71. Where is the Canterbury Plain ? For what forms of production is it specially adapted ? Roughly estimate its area as compared with Ireland.

72. Why would the establishment of industries in New Guinea be difficult ?

CHAPTER VII

AFRICA

(For Mediterranean Africa, see Chapter III., §§ 266 to 287.)

456. AFRICA, whose regular coast-line is singularly lacking in useful inlets, whose rivers—with few excep-



FIG. 71.—AFRICA: OROGRAPHICAL. (After the Diagram Co.)
1, Under 600 feet high ; 2, 600-1,500 feet ; 3, 1,500-3,000 ; 4, over 3,000.
----- = Hundred-fathom line

tions—are blocked to navigation by falls and rapids where they descend to coastal plains, and whose interior for these reasons and because of dense forests, hostile natives and vast deserts, was most inaccessible, justly earned the title of “The Dark Continent.” Exploration, however, has at last largely dispelled the darkness. We know now that Africa is mainly a vast and lofty table-

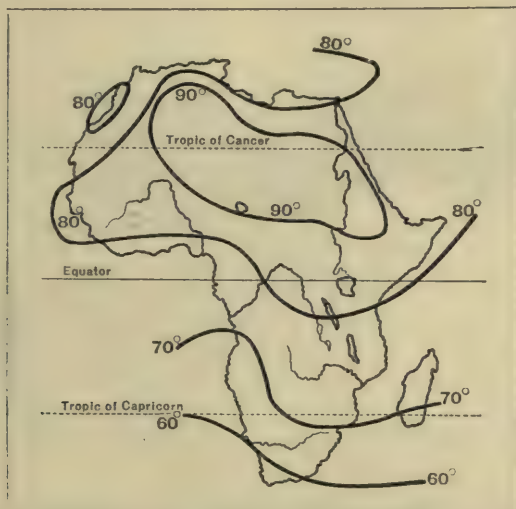


FIG. 72.—AFRICA: JULY ISOTHERMS REDUCED TO SEA-LEVEL.

land, highest in the east and south [Fig. 71] and sloping to the north-west, with a great depression occupied by the Sudan and the Sahara and crossed by an elevation running north-westward and almost reaching the Atlas highlands; while, for the size of the continent, the area of lowlands is comparatively limited.

457. Most of the continent, extending from 37° north to 34° south, lies within the tropics: and its vast

extent tends to render the climate typically continental for the tropics [8]. The height moderates the heat in

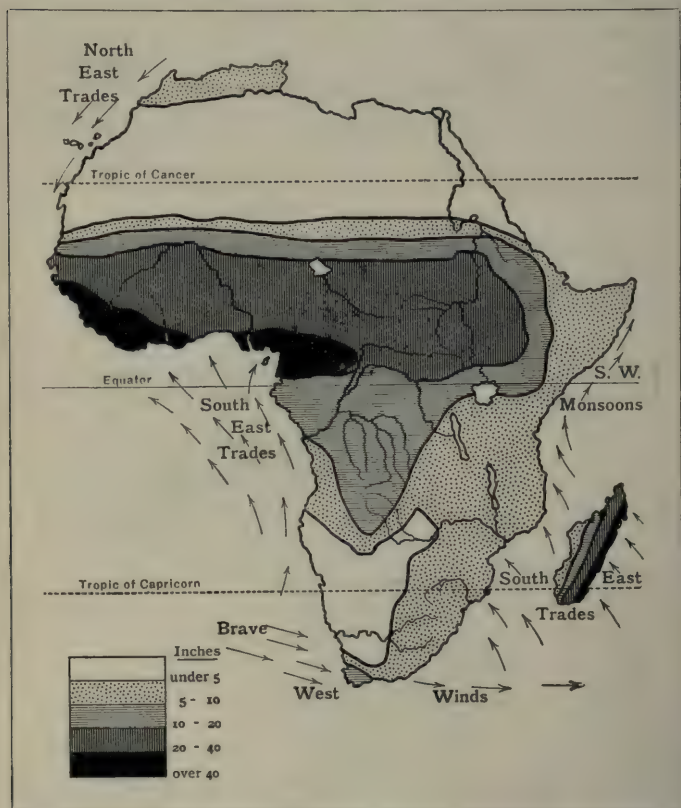


FIG. 73.—AFRICA: RAINFALL, MAY TO OCTOBER.

the east and south, the whole plateau south-east of a line joining the Congo mouth to Suakin, on the Red Sea, being over 3,000 feet in height and rising in parts

to over 6,000. Most of British tropical Africa is thus made quite fit for European settlement—a fact of the utmost importance. Many tropical regions are most unhealthy through malaria, sleeping sickness, and other diseases; but persistent medical research has in many cases succeeded in tracing the cause of the dis-

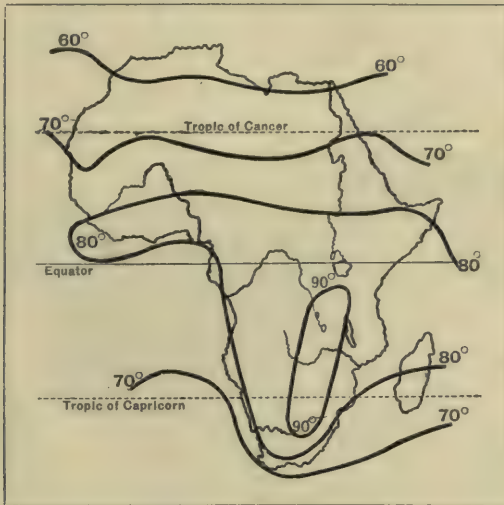


FIG. 74.—AFRICA : JANUARY ISOTHERMS REDUCED TO SEA-LEVEL.

ease, and preventive measures are robbing some of the deadliest localities of their terrors.

458. Both Trades blow away from the **west coast**, and therefore bring it no rain except in the northern summer, when they are drawn inland from the Gulf of Guinea by the heat of the Sahara [Fig. 72] and emphasise the natural equatorial rains [Fig. 73]. The south-west Anti-Trades strike the Atlas region only in the northern winter [170], and the Cape region similarly

receives only winter rains from the north-west Anti-Trades (*cf.* Australia). The **east coast**, from the equator northward, is dry, the Trades being largely

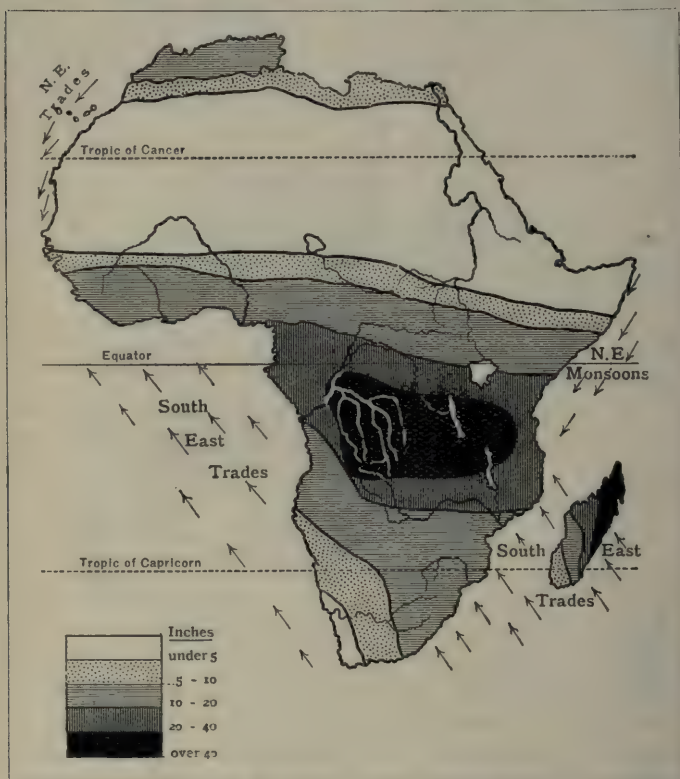


FIG. 75.—AFRICA: RAINFALL, NOVEMBER TO APRIL.

devoid of moisture and in any case blowing parallel to the coast except in the northern summer, when they are actually deflected by the influence of Asiatic monsoons [288]. From the equator southward the

south-east Trades bring a good rainfall in the southern summer to most of the plateau, over which they are drawn by the heated interior [Figs. 74 and 75], and to lofty Madagascar; in the southern winter, being

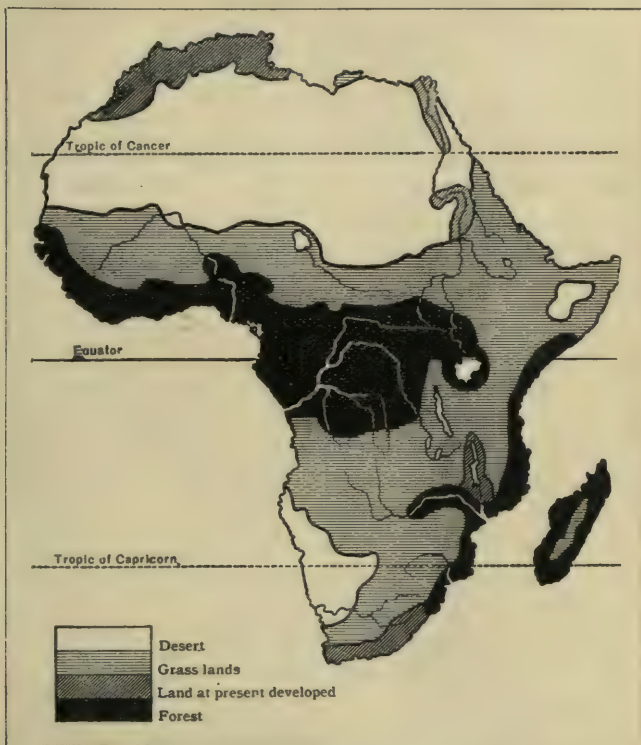


FIG. 76.—AFRICA : VEGETATION.

drier and originating farther north, they lose most of their moisture in crossing Madagascar, and during this season the east coast rainfall—except round Zanzibar—does not exceed ten inches [Fig. 73].

459. Evaporation is naturally greatest within the tropics, and the water-vapour is concentrated specially over the equatorial region. The vast and dense lower Congo and Niger forests [Fig. 76] are the direct results of the excessive heat and moisture which thus characterise all low-lying equatorial lands. The cloudless tropical skies farther away from the equator allow the hot sun's rays to beat full upon the land, and each tropic in its own particular summer is subject to a remarkable extreme of heat; where, therefore, as in the Sahara and Kalahari deserts, the winds which reach them have already lost their moisture, desert conditions are inevitable, no matter how rich the soil may be.

THE SAHARA

460. This is the largest desert area in the world, almost equalling Europe in extent. In occasional low-lying tracts, subterranean water, either emerging as wells or tapped by artesian bores, forms **oases**, some large and many supporting a fixed negro population; without these oases the desert would have proved a quite impassable barrier between northern and central Africa. The **date-palm** is characteristic, and many oases also raise fruit, grain, poultry and eggs, and even cotton and tobacco, besides providing pasture on the poor grass-lands through which they fade into the surrounding desert.

461. Cotton and leather industries exist here and there, the latter largely supported by hides obtained from nomadic tribes of Arabs who rear camels, horses, sheep and goats on the scanty desert vegetation. The aggregate produce gives rise to a quite considerable trade, mainly in dates, which is concentrated at northern oases *en route* for Mediterranean and Moroccan

ports; salt, obtained mainly in the south-west, finds its chief outlet southward *via* Timbuktu [463]. Saharan trade, however, is largely of a transit nature between the Sudan and the Mediterranean, the chief routes being shown in Fig. 79.

THE SUDAN

462. No dividing line separates the Sahara from the Sudan, which extends from the Atlantic to the Abyssinian highlands and southward to the Guinea dependencies and the Congo basin. The climate is characterised by heat and late summer rains increasing towards the south; and the prevailing vegetation is of the **savanna** type, *i.e.*, park land dotted with trees, naturally poorest towards the desert and richest towards the equatorial forests. The excellent pasture makes cattle-rearing important; while grains (mainly millet or “durra,” and maize) and beans are grown, and in many parts cotton and tobacco with the frequent addition of indigo. Ostriches are also reared. The Egyptian Sudan has already been dealt with [284-286]; the rest is under French control.

463. The **Niger**, known in its upper course as the Joliba, rises on the landward slopes of the coastal rim near the frontier of Sierra Leone; and a railway from Kulikoro, where it becomes navigable, to Kayes, at the head of navigation on the Senegal [Fig. 79], should help to develop this region. From Kulikoro the river flows through a rich pastoral and agricultural country bearing kola and shea trees to the port of Kabara. Timbuktu, on the edge of the Saharan plateau above the swamps, commands both river and caravan routes and is recovering, as a trading-centre, much of the im-

portance lost on the abolition of the slave trade. The **Senegal**, rising near the Niger source, flows through poor country yielding little but sesame and ground-nuts. St. Louis, the capital of the Senegal colony, stands at the mouth. In stormy weather, when the port is dangerous, trade is diverted by rail to Dakar, an excellent harbour south of Cape Verde.

TROPICAL WEST AFRICA

464. Excluding Spanish and French coasts north of the Gambia, this region includes various coastal dependencies from that river to the Orange. It is mainly a coastal plain, nowhere very wide, backed by highlands leading to the plateau; and from the Gambia to the Congo the climate is excessively hot and moist [459]. The heat is naturally less on the uplands, where "Sudan" conditions prevail, and where, therefore, millet, maize and other grains, cotton, tobacco and indigo are grown; while seaward slopes, above the forests and on clearings, pasture cattle and grow coffee. The dense shore-ward negro population grow yams, which, with forest fruits and nuts, form the staple food.

465. The **Upper Guinea coast**, from the Gambia to the Niger, is particularly unhealthy for Europeans, the dense forests ending seaward in a broad, swampy, pestilential belt overgrown by the useless mangrove, between which and the sea, along much of the coast, lie a series of shallow, sandy, stagnant, reed-grown lagoons, with an outer and almost continuous surf-beaten sand-bar. These lagoons are attributed partly to the action of the Harmattan, a frequent winter wind from the Sahara, which brings seaward thick clouds of fine sand and has gradually filled up the sea within a certain distance of the shore, the edge of the sand-filled fringe

having been lashed up by Atlantic breakers into the form of a bar. A regular eastward sand-bearing current has assisted the process [175].

466. European settlement has necessarily been confined to **trading "factories"** mainly on or near the coast, or centres to which natives bring rubber and palm-oil and nuts to be bartered chiefly for cottons, fire-arms and spirits, which are therefore the main imports. Besides the products named, exports include ground-nuts, ebony, mahogany, and also, in many dependencies, cotton, coffee, cacao and kola. Transport in such a land is naturally difficult. Rivers seldom afford much navigation, and as yet comparatively few roads and railways exist. The lagoons provide continuous sheltered coastal communication from the Volta to the Niger; but steamers are compelled to anchor some distance outside the bar and conduct their trade in special surf-boats.

467. Economic development under such conditions must proceed slowly. The forests possess untold wealth in palm-oil, rubber and beautiful timbers, but wasteful means of collection are still general, and this must be checked if the natural forest wealth is to be conserved. The interests of the native, too, must be considered, for the **co-operation of the negro** is necessary to the development of the region.

468. **Palm-oil** is the predominant product as far south as the Congo basin. The fruit of the palm from which it is obtained somewhat resembles the plum, and both the pulpy covering and the "nut" are rich in oil. It is difficult to estimate the wealth of the region in this product, but there are perhaps 1,000,000 square miles bearing oil-palms. Each tree is believed capable of yielding annually about 20 lbs. of oil, and there are perhaps 1,000 trees to the square mile; an estimate

implying a possible yield of 10 tons of oil per square mile.

469. **Gambia** is a small British possession occupying a narrow strip of land along each bank of the lower river, the capital, Bathurst, standing on an island on the south side of the estuary. **Portuguese Guinea** is also quite small. In **French Guinea** the chief port is Konakri, with a railway inland. **Sierra Leone** has an excellent harbour at Freetown, which is important as being about midway between Britain and the Cape. **Liberia** is an independent republic of freed slaves, originally established by the United States in their interests, Monrovia being the capital. The **French Ivory Coast** no longer yields much ivory.

470. The **Gold Coast**,¹ an important British colony, is specially notable for its recent rapid assumption of the leading place as a source of **cacao** [94],—a direct result of the moist heat, richness of soil and abundant shade. Forest products are described as inexhaustible with proper conservation. Inland communications are considerable; the Volta is navigable for 300 miles, and Accra (19,585), the capital, and Sekondi (7,725) have railways inland. Cape Coast Castle (11,364) has no railway. The Sekondi line reaches Kumasi (8,850), the capital of the **Ashanti** protectorate, through a region once more producing considerable gold. **Togo** produces good cotton, and French **Dahomey** conducts a fair trade through Porto Novo. **Kamerun**² is an important but little-developed area. The chief port is Victoria, but the trade, which includes very fine ivory, travels mainly northward across the 'Sahara' [Fig. 79]. **Spanish Guinea** is of no special moment. The **French**

¹ Area, with Ashanti, about 80,000 square miles.

² Area, 191,130 square miles.

Congo¹ bears vast and rich equatorial forests. Libreville, the capital, has the best harbour, but Loango is more important, as its hinterland is not so near Saharan routes. Brazzaville, on Stanley Pool, conducts a large steamer traffic up the Congo and its tributaries [490].

471. **Northern Nigeria**² lies mostly within the Sudan region, with its savanna grazings and grain and other products [462]. It also includes, however, a southern lowland region with typical coastal products [466], and it is more fitly considered as the natural hinterland of Southern Nigeria. It is believed capable of great cotton production, special encouragement being given and a number of ginneries having been established [108]. The mineral wealth is great, iron, lead and perhaps tin having been worked by the intelligent and energetic Moslem population for centuries; the outstanding mineral product is tin, some 9,000 square miles of rich ore-bearing land being now exploited—mainly in the Bauchi district north of the Benué. There are large deposits of inferior coal in the south, and others of better quality probably exist elsewhere. Native industries include tanning and the making of cloth, the indigo-dyed cottons of Kano being worn throughout North Africa.

472. Zungeru is the capital, but **Kano** is the chief trading centre with converging caravan routes [Fig. 79]. Sokoto and Kuka are also important trading towns. Most of the trade at present crosses the Sahara, but the recently completed railway from Lagos to Kano is largely attracting it to that port. The Niger is always navigable to Baro, and for seven months to Rabba, 600 miles inland; but from Rabba to Bussa, where Sudan

¹ Area, about 669,000 square miles (=6 times Britain); population, 1906, about 10,000,000.

² Area, 255,700 square miles (=twice Britain); population, 1911, about 9,269,000 (=½ Britain).

navigation begins [463], rapids are almost continuous. Kano might become a great slaughtering centre and source of hides but for the love of the nomads for their cattle (*cf.* India).

473. **Southern Nigeria**¹ contains, in the Niger delta, the natural home of the oil-palm [468]. The annual value of oil and nuts exported is now over £4,000,000, yet production is only in its infancy. Upland forests contain many trees quite suitable for wood-pulp. The deltaic soil is naturally rich, and this, with the moist heat and abundant shade, favours the growing of cacao, the production of which is rapidly rising [94]. Cotton-growing, as in Northern Nigeria, is being encouraged with promising results; and maize-growing is fostered, two heavy crops being regularly obtained during the year. Minerals being few, the **future** of the territory must rest mainly upon forest and agricultural resources, and upon commercial relations with the rich hinterland of Northern Nigeria. There are numerous excellent roads, and considerable inland navigation is afforded by many rivers and creeks; while the Niger itself and the railway inland from Lagos establish communications with the Sudan.

474. **Lagos**, the capital and chief port and the "future Bombay of West Africa," stands on an island in an excellent harbour, the entrance to which is spoiled by a dangerous bar necessitating the use of surf-boats; but a mole is being built and a permanent deep channel made, while the railway, which already reaches Iddo Island in the harbour, is being carried across the intervening channel to enable trains to run alongside of the wharves. Forcados and Calabar are also important ports. The main **exports** (including those of Northern Nigeria) are

¹ Area, about 79,880 square miles ($=\frac{2}{3}$ Britain); population, 1911, 7,855,749 natives, and about 1,650 Europeans ($=\frac{1}{3}$ Britain).

palm-kernels and oil, tin, rubber, cacao, cotton and timbers; and the main **imports** textiles, iron goods (including machinery), and provisions. Almost two-thirds of the total trade is with Britain.

475. **Angola**,¹ or Portuguese West Africa, is cooler and drier than the region north of the Congo. Except in the extreme north it does not fall within the zone of equatorial rains, and the direction of the Trades explains the increasing dryness of the climate towards the south. Much of the elevated interior is almost European in climate. From the tropical northern forests oil and rubber are obtained, and, from the uplands behind, coffee, cotton and tobacco; while ivory and sugar are important. Mineral wealth is said to be great. **Ambriz**, a mere roadstead, is the northern port, commanding a good route inland to the coffee-plantations. **Loanda**, the capital, has the best harbour on the Congo coast, communicating by river and rail with the interior. **Mossamedes**, the southern port, has also an excellent harbour with a large fish trade. Inland, in the Kunene basin, there is considerable European settlement and cattle-rearing; while on the dry coastal lands guano and nitrates are obtained. **Lobito Bay**, the harbour for **Benguela**, has railway communication with the rich and healthy inland plateau of Bihé, and will ultimately communicate with the Cape to Cairo Railway at Katanga [Fig. 79].

476. **German South-West Africa**² is mostly arid and healthy. In the east it forms part of the Kalahari desert [459]. Mineral riches are great, particularly in copper, which is mined in the south, and diamonds, which are

¹ Area, 484,800 square miles; population, about 4,119,000.

² Area, 322,450 square miles ($=2\frac{2}{3}$ times Britain); population, 1911, 96,197, including 13,962 Europeans ($=\frac{1}{3}$ Bradford).

exported to the value of about £1,000,000 annually. Though naturally mainly pastoral, the country is undoubtedly productive, where irrigable, and tobacco and cotton are industriously grown, the last with particular success. **Walvisch Bay**, the only really good harbour commanding the best routes inland, is British; but a good port was being created at **Swakopmund**, a short distance north, from which a railway now reaches **Windhoek**, and might easily be extended to offer the quickest route from Europe to the Transvaal. A natural southern harbour at **Angra Pequena** is being developed. Besides animals and their products, and the minerals named, the only notable export is guano, the chief **imports** being grain and flour, iron and iron goods, and textiles.

TROPICAL EAST AFRICA

477. The plateau descends abruptly to a narrow coastal plain crossed by many rivers, few being materially navigable. From the equator northward the coast is arid [458], but the lofty uplands receive a good rainfall. South of the equator the summer rains clothe the land with a rich forest-growth, fringed seaward by an almost unbroken mangrove belt (*cf.* § 465). The whole region is more open, however, and, on the whole, more fully developed than the west coast. Clearings, especially in the rich river valleys, bear heavy rice and maize crops; and rubber plantations and groves of banana, mango¹ and coconut trees are extensive.

478. **Eritrea**² belongs to Italy and includes part of the desert coastal plain of the Red Sea and of the elevated hinterland in which, being fertile and receiving a fair rainfall, some cultivation is carried on and animals

¹ Yielding both excellent fruit and tanning-bark.

² Area, about 45,800 square miles; population, about 450,000.

are reared. Massaua (2,275), the chief town and only port, has a good harbour and is the natural outlet for part of the Egyptian Sudan *via* Kassala. It also handles Abyssinian trade through Gondar, with which it has railway connection. Pearl-fishing is profitable, and gold is being exploited. **Obok** is French. Jibuti (13,396), the chief town and only port, connected by rail with Harrar in Abyssinia, shares the small trade of that country. The **Somali Peninsula** is arid with inland drainage, affording fair pasturage. The main value of the British region¹ is **strategic**—facing Aden—and the only town worth mention is the port of **Berbera** (30,000), exporting mainly animals and their products, and importing grain (mostly rice) and textiles. The trade, which formerly included Abyssinian coffee now handled by Massaua and Jibuti, is chiefly with Aden and India. The Italian territory, marching with British East Africa along the Jub river, is of little commercial value. Cattle-rearing is the main occupation. **Sokotra** is a British island off Cape Guardafui exporting cattle and butter, aloes and dates. It is strategically important as commanding the entrance to the Gulf of Aden.

479. **Abyssinia**² comprises some of the highest and most difficult country on the plateau, owing its isolation and independence largely to the difficulty of transit in nearly every direction. The great height ensures a good rainfall, which clothes most of the heated and unhealthy valleys with a dense forest-growth and enables sugar, coffee and cotton to be grown on clearings. The cooler elevations grow fruits and grains, and furnish pasturage to which most of the people devote their attention, living in primitive huts under an autocratic rule of which **Addis**

¹ Area, about 68,000 square miles ; population, about 300,000.

² Area, 432,432 square miles ; population, about 8,000,000.

Abeba (50,000) is the seat. Only iron and salt, of the many mineral riches, are worked to any extent. The difficulty of transport hampers trade, which is practically monopolised by Massaua and Jibuti. The main **exports** are coffee, ivory, hides and musk, the **imports** being nearly all textiles. Some trade is done inland with the Egyptian Sudan, chiefly in coffee, which is preferred at Khartum to the Brazilian.

480. **British East Africa**,¹ one of the most promising possessions in the British Empire, extends inland to the Congo and Sudan frontiers, thus including the Protectorates of East Africa, Uganda and Zanzibar. About three-fourths of the territory lies on the plateau, towards which the coastal plain rises through tropical forests. Most of the land is deeply covered with rich, volcanic soil, although elsewhere it is rocky and barren, *e.g.*, round the soda-impregnated Lake Rudolf. The climate, generally, is quite European; and freedom from the dreaded tse-tse fly,² despite liability to visitations of a cattle-disease known as "rinderpest," enables cattle-rearing and sheep-farming to be general.

481. All European grains and vegetables are raised, especially potatoes; and ostrich-farming has attained to the rank of an industry. In the lower and hotter districts coffee is grown. Cotton, which is receiving special attention, is rapidly growing in importance, especially along the banks of the Jub and in Uganda. The cultivation of sisal hemp is rapidly spreading, and the growing of wattle, the richness of whose bark in tannin makes it a valuable tanning agent, is now one of

¹ Area, about 370,000 square miles (= thrice Britain); population, 1911, about 7,000,000, including about 3,000 Europeans (= $\frac{1}{15}$ Britain).

² An insect whose bite is fatal to many animals, including horses, cattle, and sheep. It requires moist heat, and is therefore never found in a dry climate, or where the elevation exceeds 3,000 feet.

the chief industries (*cf.* Natal). Experiments are being made in the growing of arrowroot and cacao. In the deeper and hotter Uganda valleys, often densely forested or partially filled with reed-grown swamps, the banana is notable, furnishing the natives with food, thatching material and fibre for ropes; while sugar and ground-nuts are also important. The chief minerals are the iron and copper of Uganda, which have formed the basis of native industries for centuries.

482. On Lake Victoria, with an area equal to that of Scotland and gently sloping shores rich in forests and grazings, there are regular steamer services from **Port Florence**, the terminus of the Uganda Railway from Mombasa and Kilindini. The lake region, however, is scourged by the dreaded sleeping-sickness. **Nairobi** (14,000), with rich forests near, is the capital of the East African Protectorate, **Entebbe** (9,569), on Lake Victoria, being the administrative centre of Uganda. Kismayu, near the mouth of the Jub, is the northern port. Gondokoro has steamer connection down the Nile with Khartum. Both the Jub and the Tana provide navigation for shallow-draught steamers 400 miles inland. Railway construction, aided by an Imperial grant, is gradually opening up the cotton country. Most of the trade is with Britain, and at present passes through **Mombasa** (30,000) and **Kilindini**, both on a small coral island, the latter having the finest harbour on the east African coast. The **exports**¹ include hides and skins, cotton, maize, ivory, rubber, and coffee; **imports** are textile goods, provisions, and iron goods. Wheat, now an import, will soon become an export.

¹ The cotton export has risen remarkably [Fig. 21]; the coffee export, from £70 in 1902 to £33,781 in 1912; and the maize export has multiplied sixfold in seven years.

483. The **Zanzibar** Protectorate comprises the islands of Zanzibar and Pemba, with numerous smaller islands. The one outstanding product of the hot, moist climate is cloves. Copra and ivory, however, are also important. The roadstead of Zanzibar (35,000), on the western, sheltered side of the island, is a great emporium for the produce of many parts of the mainland, into which convenient routes lead from the shore opposite; and **imports** include large quantities of rice. Many European steamship lines provide regular services to Zanzibar and Mombasa.

484. **German East Africa**¹ is similar to British territory in topography, climate and products. It is, however, more fully developed, excellent roads existing in all directions; and it is rich in minerals and precious stones, among the former being coal, iron, lead, copper, mica and salt. **Ujiji** (175,000), in a hollow on the east coast of cliff-bordered Lake Tanganyika, formerly a great slave-trade centre, is still an important trading station. The slave route reached the coast at **Bagamoyo** (77,500) opposite Zanzibar; but now **Dar-es-Salaam** (195,500), farther to the south, with a much better harbour and a railway inland, is more important. **Tanga** (77,101) is the chief northern port, and **Tabora** (500,000) the chief inland town. **Exports** include rubber, sisal hemp, copra, ivory and coffee, and **imports** cotton goods, rice, provisions, ironware, and hardware; most of the trade is with Zanzibar and Germany.

485. **Portuguese East Africa**,² or Mozambique, contains much less temperate elevated land than either British or German territory. The coastal plain and river valleys bear dense tropical forests, and the lower

¹ Area, about 384,000 square miles; population, about 10,000,000.

² Area, 293,400 square miles; population, about 3,120,000.

Zambesi plain and delta are hot, very unhealthy, and infested by the tse-tse fly. Mangoes, oranges and the sugar-cane are grown on the delta, and other lowland products are rubber, oil, copra, wax and ground-nuts. The upper Zambesi valley contains excellent grazing-land to which the tse-tse fly does not penetrate. The chief town is Mozambique (362,734), and the chief port unhealthy Lourenço Marquez (9,849), with a splendid harbour on Delagoa Bay, which offers the shortest and most direct railway route to the Transvaal [Fig. 79]. Beira (3,420), equally unhealthy, has a good harbour and provides a quick railway route to Southern Rhodesia. On a northern distributary of the

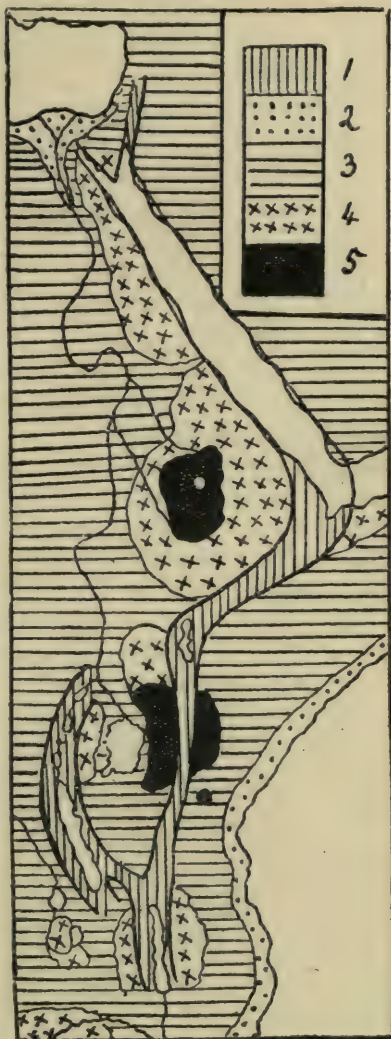


FIG. 77.—EAST AFRICA: STRUCTURAL DIVISIONS. (After J. W. Gregory.)

- 1, Dry floor of the Rift Valley; 2, Lowlands formed of recent deposits; 3, Tablelands composed of sedimentary rocks of various ages; 4, Plateaux of ancient crystalline rocks; 5, Tablelands and mountains of volcanic rock.

Zambesi stands Quilimane, formerly the chief port; but Chinde (1,690), on what is now the most navigable channel, has superseded it. The Zambesi is navigable for shallow-draught steamers as far as Kebrabasa, above Tete, where there is a large unopened coal-bearing area; and the Shiré tributary is navigable, with one interruption, to Lake Nyasa. The Limpopo is practically useless. The total trade is small.

486. Tropical East Africa is traversed from north to south by the **Great Rift Valley**, part of which is occupied by the valley of the Jordan and the Red Sea [Fig. 77]. The course of the subsidence is clearly traceable by its more or less regular width throughout, and by the abruptness of the descent from the heights on either side. From Lake Nyasa a branch of the double fracture is to be traced north-westward to where Lake Tanganyika lies deeply sunk between almost parallel cliffs, its further extension being marked by a series of lakes ending with Lake Albert. The formation of these lakes is in distinct contrast to the squareness and sloping shores of Lake Victoria, in an ordinary depression on the plateau.

487. **Madagascar**¹ is a replica in miniature of Africa, consisting of a plateau, higher in the east than in the west, descending steeply to a narrow, eastern coastal plain and more gradually towards a wider, western coastal plain. The coast-line is remarkably regular, except in the north-west. The island receives heavy rains at all seasons from the S.E. Trades, and its unhealthy tropical lowlands grow sugar-cane, rice, cacao and cotton; eastern forests are rich in rubber, gums, fibres, and tanning and dyeing barks, clearings forming ideal coffee-lands. The elevated interior, behind the

¹ Area, about 228,000 square miles ($= 1\frac{1}{8}$ Britain); population, 1911, 3,104,881, including 12,120 Europeans ($= \frac{1}{10}$ Britain).

eastern bluff, is temperate, dry and healthy, with excellent sheep and cattle pastures. Rice is grown—with maize—in the lower, hotter and moister valleys. Cacao, tobacco, vanilla and cloves are also produced, and the growing of the mulberry for silk is specially encouraged.

488. **Antananarivo** (94,813), the capital, lies near the centre, its chief port being eastern **Tamatave** (8,761). **Mojanga** (7,205), on the north-west, is becoming important, having a better harbour, easier access to the interior, and inland navigation for 60 miles. The great mineral wealth in gold, silver, coal, iron, copper and sulphur is little exploited. The natives are skilled metal-workers, however, silk and cotton are woven, and factories are being erected for sugar-refining, rice-husking, soap-making, brewing, and other branches of industry using natural products. The lack of railways and good roads seriously hinders development. The trade is mainly with France, to whom the island belongs.

CENTRAL AFRICA

489. Central Africa lies mainly on the great plateau, most of it being thus over 3,000 feet. The **Belgian Congo**,¹ formerly the Congo Free State, was annexed by Belgium in 1908. The plateau slopes north-westward to the lower Congo basin, where the river flows through a vast area of extremely hot, moist and unhealthy plain, covered with an almost impenetrable equatorial forest-growth. The uplands are naturally cooler, drier and more healthy, and quite suitable for agriculture. The only transit is by the river system, access to which from the sea is unfortunately blocked by 200 miles of rapids

¹ Area, about 909,650 square miles ($=7\frac{1}{2}$ times Britain); population, 1911, about 15,000,000, including 4,003 Europeans ($=\frac{1}{3}$ Britain).

and falls between Matadi and Stanley Pool¹ where the Congo breaks through the western edge of the plateau.

490. Above Stanley Pool the river is navigable for 1,200 miles to Stanley Falls, while its many large, deep tributaries bring the total length of navigable waterways up to about 7,000 miles—all within reach by steamer from Leopoldville, the capital. The natural products of the forests include rubber, palm-oil and nuts, copal and ivory. The tse-tse fly prevents cattle-rearing on the uplands, but the natives cultivate bananas, manioc, millet, maize and tobacco, and promising plantations of rubber, coffee and cacao are undertaken by government enterprise. The chief minerals worked are gold and copper, while coal, iron, tin and manganese have also been found. The **Katanga** region in the south-east is especially rich in copper, and has now been reached by the Cape to Cairo Railway [507]. The projected line to Lobito Bay [Fig. 79] will form its quickest and best route to the sea.

491. The largest steamers may ascend the Congo to **Boma**, and large vessels to **Matadi**. The most important inland centres are naturally on the rivers; the chief are Bangala, or New Amsterdam, at the north-west bend of the Congo; Basongo, at its junction with the Aruwimi; Stanleyville, at Stanley Falls; and Kibongo and Nyangwe on the navigable river above the Falls. Nearly all the trade is with Belgium; the chief **exports** are rubber, ivory, palm-oil and nuts, copal, gold, silver and cacao; and the chief **imports** cotton goods and wearing apparel, provisions, metal-wares and machinery.

492. **Nyasaland**² is a long, narrow British protectorate,

¹ Now surmounted by a railway [Fig. 79].

² Area, 39,801 square miles; population, 1912, about 1,000,000.

involving most of Lake Nyasa and the Shiré valley. The climate, owing to the elevation, is almost European; and the fine grass-lands support many goats, sheep and cattle. Millet and maize are staple crops. The tropical forests of the lower Shiré valley yield rubber, the upper slopes bearing excellent coffee plantations; tea is also promising. Two of the most "likely" crops, however, are tobacco [139], which is fine and already heads the list of exports¹ in value, and cotton, which is exported in rapidly-increasing quantities [Fig. 21]. The chief settlement is at **Blantyre**, in the eastern Shiré highlands, Zomba, farther north, being the official capital. Good roads are being made in all directions. A railway, already partly constructed, will connect Lake Nyasa with Chinde, the Portuguese port through which the external trade is conducted duty-free—at present by river-steamers. The chief **exports** are tobacco, cotton, rubber, coffee, wax and ivory; and the chief **imports** textile goods, hardware and provisions. Of the total trade 80 per cent. is with Britain.

493. **Rhodesia**² lies entirely on the inland plateau, and the climate—except in the sunken, tropical, eastern valleys—is dry, warm and healthy. The comparatively small European population is chiefly engaged in the mining districts of Southern Rhodesia. The land nearly everywhere is suitable for European settlement. The rainfall diminishes towards the west, where serious periodical droughts occur. The locust, though troublesome, may be successfully handled as in Cyprus. The rinderpest at times attacks cattle, but the tse-tse fly is confined to the lower valleys.

¹ Having risen from £947 in 1905 to £54,081 in 1912.

² Area, about 440,000 square miles (= $3\frac{1}{2}$ Britain); population, 1911, about 1,770,000, including 25,016 Europeans (= $\frac{1}{25}$ Britain).

494. The territory is rich in minerals, of which **gold**¹ is the most important—particularly in Southern Rhodesia between Salisbury and Bulawayo. Copper, zinc and lead are also mined; and coal exists largely, the Wankie



coal-fields north-west of Bulawayo being especially notable. There is considerable navigation by the Zambesi and its tributaries, and railways are increasingly important [Fig. 79]. Among the **exports** gold represents

¹ The export now exceeds £2,500,000 yearly.

five-sixths of the total value, and tobacco is prominent. Northern Rhodesia is mostly covered with thin forest containing useful timber and many rubber trees which are wisely protected by a careful forestry system. Tobacco, cotton and hemp, all found growing wild, are receiving special attention with encouraging results. **Livingstone** is the administrative centre, and Fort Jameson and Broken Hill are important. The northern territory is separated by the Zambesi from the southern, the capital of which is **Salisbury**, other important towns being **Bulawayo** and Victoria.

495. The **Bechuanaland** protectorate is very dry—particularly in the west, which is part of the Kalahari Desert [459]. The south-eastern “veld,” or open grass-land, is fairly good, and in parts the natives find it possible to grow “mealies” (maize) and other crops ; but the main occupation of the scanty population is the rearing of cattle, sheep and goats, the first supplying the large slaughter-houses of Johannesburg. A large northern area of inland drainage, ending in the Makarikari Salt “Pans,” and the valley of the Malopo—which at times, however, is almost dry—might be irrigated. The Commissioner’s headquarters are at **Mafeking**.

SOUTH AFRICA

496. South Africa, now **entirely British**, includes the Union of South Africa and the two small protectorates of Swaziland and Basutoland. The region consists mainly of the gradual culmination of the great plateau in the lofty southern and eastern coastal mountains, behind which the eastern “veld” receives sufficient rain for agriculture, while the west is dry and suitable, so far, for little but pasture, though dry farming [24] might yet make much of it productive. The northern

“bush-veld” is often wooded, with a sufficient rainfall for agriculture; while in the low, eastern Transvaal and the many deep valleys the climate is hot, moist and unhealthy, and the vegetation tropical.

497. The coastal ranges descend on the east by grassy slopes, supporting large flocks of sheep and goats, to a plateau where the rainfall and the warmth grow maize and fruits to perfection, and many cattle and horses feed on the rich grass; while the plateau descends in turn by warm tea-growing slopes to a narrow coastal plain where the moist heat produces abundant sugar and a rich wattle crop. On the south the descent to the sea is made by successive steps, separated from each other by minor ranges. The highest of these steps is a long, wide plain known as the Great Karroo, so dry that the only vegetation relieving the brownness of the expanse is a scattered bush-growth affording a useful sheep-food (*cf.* § 419). Quite similar, though smaller, is the lower plain known as the Little Karroo, which finally leads over the seaward ridge to the southern coastal plain. On both Karroos merino sheep and Angora goats thrive. In the south-west winter rains prevail and the vegetation is of the “Mediterranean” type (*cf.* § 418), the vine and stone-fruits being especially successful.

498. **Rivers** or torrents are of little use for either navigation or irrigation. Those of the coastal region descend by waterfalls, and are obstructed by bars created by a strong “silting” current [175],—the warm Agulhas current—which, flowing westward, meets and mingles with the cold Benguela current off the Cape of Good Hope [Fig. 78], giving rise to the fogs so prevalent there (*cf.* Japan, § 367). Rivers of the interior, on the other hand, flow in deeply sunk channels and are

mostly flooded and swift in summer and almost dry in winter; so that even their channels are useless as routes and a general hindrance to cross-country transit.

499. The **Transvaal**¹ province is cultivable only in the east, maize being the main crop, while tobacco is also successful and important. The western half, being dry, is suitable only for stock-raising, but much is said to be irrigable and dry farming may prove successful. Minerals, however, constitute the main wealth, and gold is the outstanding feature [Fig. 80], the Transvaal being the chief source [168]. The chief gold-field is the Witwatersrand ("White-Water-Ridge") district, of which Johannesburg is the centre, other notable fields lying round Pietersburg and Barberton. Diamonds are obtained near Pretoria. The chief coal-fields are at Boksburg and Middleburg. **Pretoria**,² the capital, commands several railways [Fig. 79]. **Johannesburg** (237,220),³ the "gold" city, has convenient coal and iron at Boksburg and Ermelo respectively, and is already a great industrial centre.

500. **Swaziland** occupies the south-eastern seaward slope of the Transvaal region. The people follow mainly agriculture and stock-raising. The country is said to be rich in minerals, but tin alone is mined to any extent.

¹ Area, 110,426 square miles (= $\frac{1}{2}$ Britain); population, 1911, 1,686,212, including 7420,831 whites (= $\frac{1}{3}$ Scotland).

² White population, 29,618.

³ White population, 119,953.

TOTAL
£ 38,500,000
GOLD
9/10
DIAMONDS
1/25
COAL 1/40
TIN
ALL OTHERS

FIG. 80.—
TRANSVAAL
MINERAL
OUTPUT.

501. The **Orange Free State**¹ province consists mainly of undulating grassy plains. As in the Transvaal, agriculture flourishes only in the east, maize prevailing in the north and wheat in the cooler south; but the area is increasing. The excellent natural grazing, however, and the dryness of the west explain why stock-farming remains the main industry. Diamonds are produced to an annual value of £1,500,000 at Jagersfontein and Koffyfontein, and the coal output at Kroonstad is about 500,000 tons. **Bloemfontein** (26,889) is the capital, and **Springfontein** an important southern railway junction [Fig. 79].

502. **Basutoland**² occupies the south-eastern corner of the Orange Free State "circle" to the westward of the sheltering Drakenberg. The well-watered, fertile soil, said to be the best grain-land in South Africa, and the rich grazing with its many cattle support the comparatively dense population. Wool, wheat and "mealies" are the chief products. Coal is mined, and iron and copper are said to exist.

503. **Natal**,³ entirely on the seaward side of the mountains, receives a good summer rainfall; the temperature varies from the warmth of the sheep-rearing heights to the tropical heat of the sugar-growing coastal plain. Maize and millet represent nearly all the grain produced. The most notable recent developments have been in the production of (a) wattle⁴ for tanning-bark, (b) fruit⁵ and pumpkins on the inland plateau on

¹ Area, 50,389 square miles; population, 1911, 528,174 (175,189 whites).

² Area, 11,716 square miles; population, 1911, 405,903 (1,396 whites).

³ Area, 35,290 square miles; population, 1,194,043 (98,582 whites).

⁴ The output has been more than doubled in two years.

⁵ The acreage has increased more than tenfold in two years.

lands near the railway, and (c) green vegetable crops.¹ Tea-growing is not at the moment extending, but will, it is hoped, soon be able to supply the entire needs of South Africa and furnish a valuable export. Natal contributes substantially to the enormous South African export of wool, hides and skins. The number of sheep and goats has increased over 100 per cent. in ten years, that of cattle having increased 50 per cent.

504. The province is rich in many minerals. The finest steam-coal is obtained from the mines of Dundee and Newcastle, with convenient iron not far distant; and good coal is also mined near St. Lucia Bay. Gold is mined in the north-east and the south. **Maritzburg** (30,539),² the capital, in a hot, beautiful and prolific hollow amid the orchards of the plateau, is becoming a great fruit-collecting and forwarding centre. Natal, though possessing 360 miles of coast-line, has only one real port in **Durban** (72,512)³ with its outport, Port Natal, where the harbour, though now deep, is kept so only by constant and expensive dredging. The port is of great and increasing importance as (a) the point of convergence of many railways through a rich province [Fig. 79]; (b) the natural outlet for most of the Orange Free State; (c) a coaling station, with convenient access to the Dundee and Newcastle mines; and (d) a whaling station for the Antarctic.

505. The **Cape of Good Hope**⁴ province is the chief wool and mohair producer in the Union. The Great Karroo is the main source, and the larger flocks of the somewhat less dry east explain the concentration of

¹ The acreage has increased almost fourfold in two years.

² White proportion, 14,848.

³ White proportion, 53,271.

⁴ Area, 276,995 square miles (= $2\frac{1}{2}$ times Britain); population, 1911, 2,564,965, including 583,177 whites (= $\frac{1}{8}$ Britain).

collection at **Graaff Reinet** (8,000), the predominance of **Port Elizabeth** as a wool-port, and the importance of wool-washing at **Uitenhage** (12,000). Ostrich-farming is mainly centred round Oudtshoorn, where, by irrigation, lucerne furnishes the finest food for the birds. Tobacco is also important at Oudtshoorn. Cattle are reared on the moister coastal plain. In the "Mediterranean" climate of the south-west, the vine gives rise to an increasingly important wine industry, and other fruits are shipped early every year to London.

506. The province is rich in minerals, the output of diamonds—the finest in the world—from the Kimberley¹ district approaching £6,000,000 annually. The rich copper mines of Ookiep are connected by rail with the western harbour of Port Nolloth. Coal is mined in the north-east. There are many southern bays, but the silting current already mentioned [498] explains the paucity of useful harbours, which are unfortunately open to south-east winds and often dangerous to shipping. **Port Elizabeth** (31,000)² is the chief port, handling not only the bulk of the woollen export but most of the foreign trade and that of the southern Orange Free State. **East London** (21,000)³ follows Port Elizabeth as a wool port. **Cape Town** (67,000),⁴ the capital and legislative centre of the Union, has an excellent harbour, and monopolises the export of gold and diamonds; but its extreme south-western position is not nearly so convenient for the productive eastern region as, *e.g.*, Port Elizabeth or Durban.

507. The **Cape to Cairo Railway** (*cf.* Fig. 79), when completed, will not fulfil the more usual function

¹ Population, 1911, 30,000, including 13,598 whites.

² White proportion, 18,190.

³ White proportion, 12,279.

⁴ White proportion, 29,863.

of a trans-continental line—like those of America—in linking up one ocean highway with another, but it will traverse a vast continent from end to end, through regions yielding complementary products the exchange of which will lay the foundation of an enormous north-and-south current of commerce; and it will offer a quick—if uncomfortably hot—passenger route from Europe and Egypt to South Africa, one of the greatest and richest British possessions of the future.

508. Foreign Trade. — Six-sevenths of the gold exported [Fig. 81] comes from the Transvaal. Most of the wool is furnished by the Cape, and the total yield, which has increased 50 per cent. in five years, is still capable of considerable increase. Mohair, almost entirely from the eastern Great Karroo, is very fine and greatly in demand. The output of ostrich feathers has increased as rapidly as that of wool, and is also capable of great expansion. The export

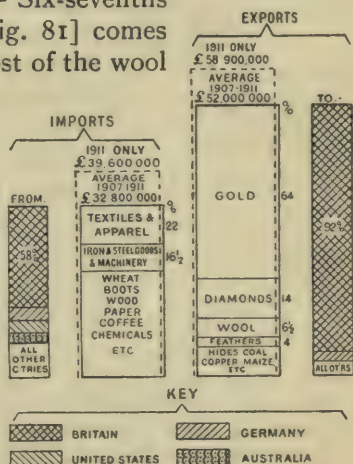


FIG. 81.—BRITISH SOUTH AFRICA: FOREIGN TRADE.

of hides and skins, which has almost doubled in five years, testifies to the remarkable spread of sheep and cattle-rearing which, within quite a few years, has enabled South Africa practically to dispense with imports of meat and mutton [Fig. 29]. The coal output has more than doubled in five years. The growth of maize production is especially noteworthy [Fig. 82],

and South Africa must be regarded as one of the great exporters of the future. Tobacco, wine, wattle-bark, and fruit, although at present small exports, are all increasing. Imports of cotton goods and timber continue to increase, and of wheat, flour and meat to decrease. The sugar import is also declining—with the development in Natal.

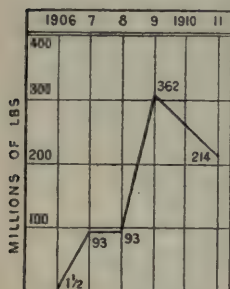


FIG. 82.—GROWTH OF SOUTH AFRICAN MAIZE EXPORT.

509. **The Future.**—Industries, generally speaking, are still in their infancy. The inevitable development will be mainly—at all events at first—in the further exploitation of minerals, the rear-

ing of stock, and agriculture; while enormous supplies of hides and wattle should support great tanning and leather industries.

AFRICAN ISLANDS

(For Sokotra, see § 478; Madagascar, §§ 487, 488.)

510. The **Seychelles** are British, the chief island being Mahé, on which stands the capital, Port Victoria. The chief products of the tropical climate are copra and vanilla. The rich fisheries enable salt fish to be exported. The **Comoro Islands** are politically attached to Madagascar. Sugar, formerly the chief product of the moist heat, has been largely replaced by vanilla. There still remain, however, some sugar refineries and rum distilleries. Cacao is also grown. **Mauritius**,¹ with a hot climate and heavy cyclonic rains, is still well-wooded and richly productive of sugar, of which its exports almost entirely consist. Aloes are grown

¹ Area, about 720 square miles; population, 1911, 377,083.

for fibre. The main imports are iron goods and machinery, cotton goods and manures.

511. Mountainous **Réunion**¹ is French. The hot, moist climate yields rich crops of sugar, and coffee, vanilla, tapioca, spices, and aloes (for fibre) are important, while rum is largely distilled. The capital is St. Denis (23,972). **St. Helena** is British. Rains are abundant, but most of the island is barren through deforestation. Potatoes are the main crop, but fruits are now increasingly grown, and rapidly-extending crops of "New Zealand" flax [448] support a promising industry. Lace-making is developing, and the fisheries are important. The capital, Jamestown, is a coaling-station. **Ascension** is a barren, fortified, volcanic island belonging to Britain, whose one product—turtles—supports an industry in tortoiseshell. The capital is Georgetown. The island is chiefly retained as a military sanatorium.

512. **St. Thomas**² and **Princípio** are Portuguese islands in the Gulf of Guinea, with rich, volcanic soil and a hot, moist climate. The main crops are cacao, of which St. Thomas is one of the chief sources [94], coffee, rubber, and cinchona. **Fernando Po**³ and **Annabon**, part of the same volcanic group, belong to Spain and yield similar products. The **Cape Verde Islands**⁴ are Portuguese, and grow coffee, millet and various drugs. The **Canary Islands**,⁵ belonging to Spain, enjoy a warm, delightful climate. Grapes and other fruits—particularly bananas—are grown on the sunny slopes, and early potatoes and tomatoes on the coastal plains. Tobacco is also important, and mountain grazings support many goats. **Las Palmas** (53,824) is an important coaling-

¹ Area, 970 square miles; population, 173,822 (159,218 Europeans).

² Area (with Princípio), 360 square miles; population, 1900, 42,103.

³ Area (with Annabon and smaller islands), 814 square miles.

⁴ Area, 1,480 square miles; population, 142,552.

⁵ Area, 2,807 square miles; population, 1910, 419,809.

station. **Madeira**¹ is Portuguese, Funchal (20,844) being the chief town. The mild, dry climate attracts many invalids, whose patronage has developed a large industry in embroidery and the making of wicker-work. The rich, volcanic soil furnishes a large export of grapes, bananas and other fruits; and the wines of the island are famed. The **Azores**,² also Portuguese, enjoy a climate similar to that of Madeira, and fruits are again the main product, oranges and pineapples predominating. Ponta Delgada (17,620) is the chief town.

QUESTIONS

73. Why was Africa so long "The Dark Continent"?
74. Describe briefly the Sahara, assigning reasons for the prevailing desert conditions.
75. Write a short description of the climate, natural vegetation and products of the Sudan.
76. Write a short essay on the oil-palm.
77. Palm-kernels and oil form 80 per cent. of the exports of Nigeria. Is such a predominance "healthy"?
78. Give a brief general description of the Upper Guinea coast, accounting for its climate.
79. Discuss the future of Nigeria.
80. Why is the climate of Damaraland arid? Why is that of Madagascar moist?
81. Mention, with explanations, the most promising products of British East Africa.
82. Write short notes on copra, the shea-nut, the tse-tse fly, guano, mohair, the veld, the Great Karroo, wattle.
83. Discuss, from the geographical point of view, the prospects of Lagos, Johannesburg, Durban, Ladysmith.
84. Describe the route of the Cape to Cairo Railway. Will the cost of its construction be justified?

¹ Area, 314 square miles; population, 1911, 169,777.

² Area, 922 square miles; population, 1911, 242,613.

CHAPTER VIII

NORTH AMERICA



FIG. 83.—NORTH AMERICA: OROGRAPHICAL. (After the Diagram Co.)

513. NORTH AMERICA, about two-and-a-half times as large as Europe, is roughly triangular, flanked east and west by highland belts [Fig. 83]. The vast interior plain,

widening northward, slopes gently from the low Lake elevation to the Arctic and Mexican Gulf shores. The St. Lawrence alone, of interior rivers, breaks eastward to the sea; others feed either the Arctic Ocean or the Mexican Gulf, the former being therefore of little commercial value. Useful eastern rivers descend from the highlands to a wide coastal plain by falls whose "power" led, in the early days, to the growth of towns along what is called the "fall line" [Fig 84]. Most of these are now important cities at the head of navigation on their respective rivers, profiting fully by hydro-electric developments [43]. The

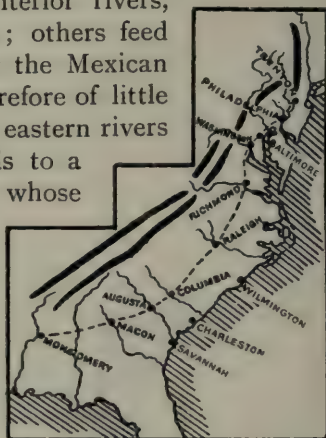


FIG. 84.—CHIEF TOWNS ON THE "FALL LINE."

wide western highlands consist of several parallel mountain ranges with intervening plateaux and valleys [Fig. 85]. The steep western descent leaves no great width



Section on Parallel 36°N.
Vertical height much exaggerated.

FIG. 85.—NORTH AMERICA; LATITUDINAL SECTION.

of coastal plain, most rivers being thus of limited commercial value.

514. **Climate—Winds and Rainfall.**—The west coast cannot expect rains from the N.E. Trades, which

blow *away* from it [Fig. 86]. The Anti-Tradcs, however, bring rain at all seasons north of the 44th parallel, and in winter to the region between that parallel and the 34th,



FIG. 86.—NORTH AMERICA: MEAN ANNUAL RAINFALL.

whose climate is thus essentially "Mediterranean" [170]. South of the 23rd parallel heavy summer rains are brought by winds drawn inland by the

heat of the Mexican plateau [Fig. 87], but from about the 34th parallel to the 23rd the coast is arid. The **east coast** receives little winter rain from either Trades or Anti-Trades, both commonly blowing *along* the coast ; but the summer indraught due to the heated interior furnishes a good rainfall which is increased by occasional cyclonic storms—often violent and destructive. The

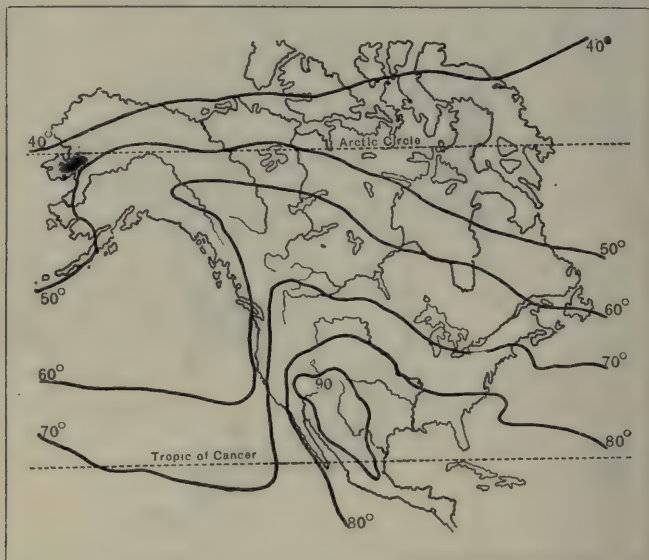


FIG. 87.—NORTH AMERICA: JULY ISOTHERMS REDUCED TO SEA-LEVEL.

interior receives rain from the same sources, but the precipitation speedily diminishes towards the west, to which even moist winds from the Mexican Gulf, carrying rain to the prairie, seldom penetrate, the 95th parallel of longitude practically marking the western limit of adequate rainfall [Fig. 86]. The **Great Lakes** are a source of rain ; in summer vapour-laden winds are drawn

shore-ward by the heated land ; in winter the evaporation is naturally less, but, as the surrounding land is then colder than the water, the air blows *towards* the Lakes, over which it rises, depositing its moisture in the form of the characteristic heavy snows.

515. Temperature.—In the interior, shut off from both oceans by mountains, extremes of temperature are

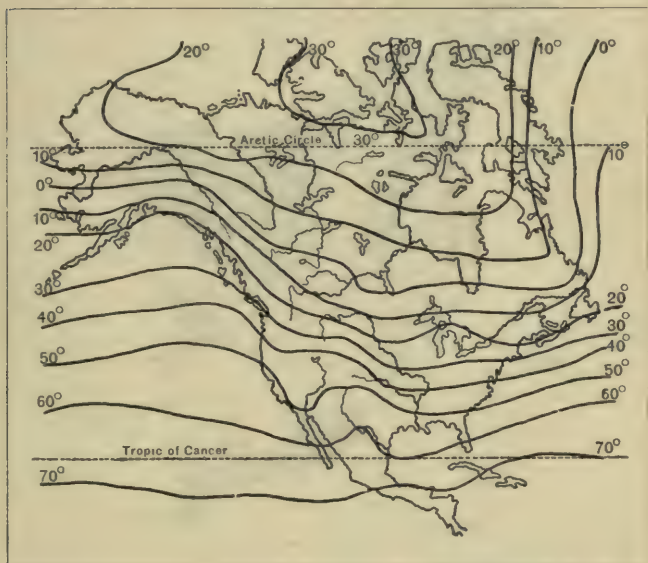


FIG. 88.—NORTH AMERICA: JANUARY ISOTHERMS REDUCED TO SEA-LEVEL.

naturally “continental” [Figs. 87 and 88], while the Pacific range is distinctly “oceanic.” Atlantic extremes are rather continental than oceanic, the winter cold being intensified by the Labrador Current [Fig. 3]. This current first meets the warm Gulf Stream south of Newfoundland, where the cold air over the former, mingling

with the warm, moist air over the latter, condenses the water-vapour into the characteristic fogs. The Lake elevation is so low and its slope so gradual that Mexican

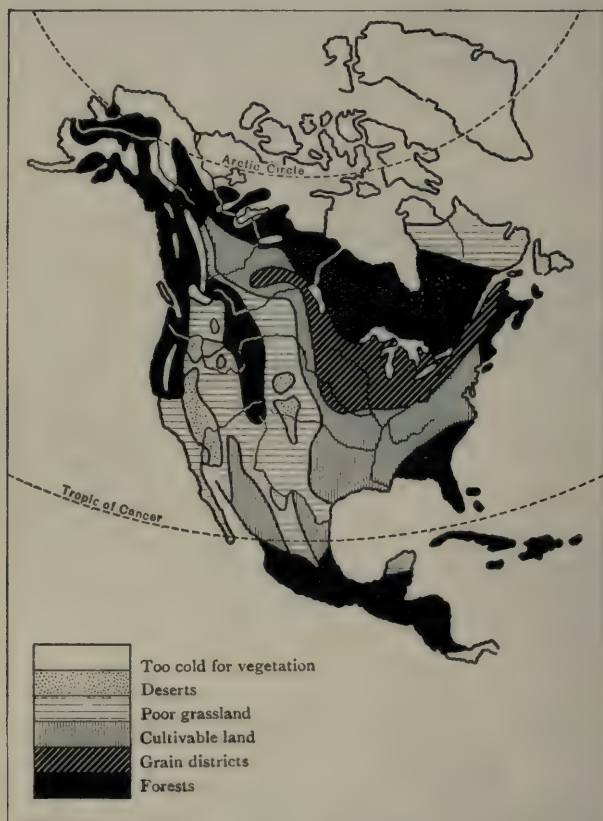


FIG. 89.—NORTH AMERICA : VEGETATION.

Gulf winds are occasionally able to cross it, the coolness of the Lakes obtaining from them moisture uncondensed in their passage over the prairie; and occasional cold

Arctic winds similarly reach sunny Florida and ruin her extensive orange-groves. The temperature of the western interior is kept above the average, as isotherms testify, by the dry, warm "Chinook" winds,—really the S.W. Anti-Trade after their passage over the western highlands has deprived them of their moisture.

516. **Natural Vegetation.**—Most of Alaska and a wide Arctic belt are tundra [141], merging gradually southward into a wide forest belt which, towards the east, reaches south to the Lakes and the lower St. Lawrence [Fig. 89], the trees varying in kind with the latitude [141]. The magnificent Pacific timbers have already been mentioned [142]. Harder woods abound in the east of the southern interior [143], the eastern highlands are heavily forested, and vast sandy stretches on the Atlantic plain bear valuable pines. The vegetation of the interior varies from east to west with the moisture, and from north to south with the warmth. It may be broadly said that west of the 95th parallel the drought makes the "Great Plain" mainly "steppe" [323], with large arid tracks towards the still drier west; while east of that parallel the "prairie," with its more regular and adequate rainfall, is now the scene of widespread cultivation from the timbered Lake region southward through successive belts of wheat, maize and cotton to the hot Mexican Gulf.

BRITISH NORTH AMERICA

CANADA

Area, 3,603,910 square miles (=30 times Britain); population, 1911, 7,204,838 (=Greater London).

517. Canada is most important as a wheat-grower; but, although wheat is distinctly the chief export, both

oats and hay cover as much land, the oat-crop being commonly about twice as heavy as the wheat-crop. One of the most interesting phases of Canadian development is the change in the form of production which is noticeable in nearly every province. Eastern provinces have long demonstrated the advantages of **mixed farming**, *i.e.*, stock-rearing combined with cultivation, and now largely specialise in dairying; central or "prairie" provinces, till quite recently regarded as essentially wheat-growing, are being forced by economic conditions to devote increasing attention to mixed farming; Alberta, the "ranching" province, is losing its claim to the title, as irrigation and dry farming enable it to grow the very finest "hard" wheat; while even there and in the agricultural parts of British Columbia the claims of mixed farming are compelling attention, its chief advantage being that it arrests the deterioration of the soil caused by the repeated extraction of crops from the same land.

518. **Wheat.**—Canada's position as a grower and exporter has been shown [64-5; 67]. In view of the vast distances which grain has to travel to reach the sea, her enormous output has for years increasingly overtaxed the carrying capacity of the few great railways converging upon Winnipeg, but with the increase of railway construction and the opening of the Panama Canal [534], the congestion will be relieved and new wheat-lands brought into bearing. Increase of production is most rapid in Saskatchewan and Alberta. The former at present leads, furnishing almost half of the total yield; Manitoba follows with rather over one-fourth, Ontario with one-tenth and Alberta with one-thirtieth. The wheat-flow is almost entirely through Winnipeg to Fort William and Port Arthur on Lake Superior, where the grain is stored in mammoth storage-bins or

“elevators” until it can be shipped, government certificates attesting the quantity and grade of grain lodged in the elevators [152].

519. Ontario devotes most land to **oats**, Saskatchewan following; but the richer soil of the latter enables her to lead in production. Almost all the **hay and clover** are grown in the cooler, moister east, supporting the great dairying industries. The acreage under **barley** has lately decreased; half the crop is raised in Manitoba, and most of the rest in Ontario, where, with oats and maize, it is a valuable animal-food and supports a growing brewing industry. **Maize** was believed incapable of succeeding in the moderate heat of Canada; but it is proving satisfactory in southern Ontario and in parts of Quebec, and even in the south-west. Nearly all the crop is raised in Ontario for use as an animal-food. **Potatoes** are important, but tend to become less so. Most of the production is in the cool, moist east, the Nova Scotian crop being considered the finest. **Flax** is the only fibre largely raised, and production is rapidly growing.¹ Saskatchewan raises five-sixths of the crop, most of the rest coming from Manitoba and some of the finest from the Fraser River valley in British Columbia. **Tobacco** is promising in the Lake Peninsula, in certain favoured parts of Quebec, and in British Columbian valleys.

520. **Rye**, although but one-hundredth of the wheat-crop in volume, is still important—for the making of whisky. Ontario raises two-thirds of the crop. **Alfalfa**, or lucerne, whose marvellous properties [176] are rapidly commending it to farmers, is being introduced everywhere and should be particularly valuable for stock-raising in the drier west. Buckwheat is

¹ The acreage recently increased eightfold in two years.

grown in the east, and peas and beans are prominent in Ontario. The **sugar-beet** is grown in Ontario, and more particularly, recently, on irrigated land in Alberta, the crop being described as exceptionally fine. Apart from its "sugar" value, the virtue of the residue as a cattle-food should assist stock-raising there. **Fruit**, except in the prairie provinces, is increasingly important. Apples are a special product in cooler Nova Scotia, the "oceanic" Lake influence favouring grapes and most temperate fruits on the Lake Peninsula; while favoured British Columbian valleys grow perfect apples, pears and plums.

521. **Dairying**.—While the demand for dairy products is great in all settled parts, it is only in the east, so far, that production has developed as an important industry. This is due to the greater suitability (*a*) of the newer, drier provinces for wheat-growing, and (*b*) of the rich grass-land of the cooler, moister east for dairying. But the industry, for reasons mentioned [517], is rapidly assuming importance elsewhere. Quebec, with almost 3,000 butter and cheese factories, is pre-eminently the dairying province, the development along co-operative lines [151] during the last fifteen years having been marvellous. Ontario has been almost as remarkable, that province already possessing half as many factories as Quebec and supplying most of the western demand. The large cheese export [153] comes mainly from Quebec. The chief western development should occur in southern Alberta, where the warm Chinook winds enable cattle to graze in the open throughout the year, and the absence of flies in the dry climate would be a special advantage. **Stock-raising** offers as good prospects as almost any other branch of production. The entire meat output of the

Dominion falls far short of the demand, and consequent high prices are inducing production wherever conditions permit. Ontario leads with two-fifths of the cattle and sheep and more than half the hogs in the Dominion. Alberta now raises excellent farm horses, which are increasingly demanded at high prices.

522. Forest Products.—A conservative estimate places the total area of “merchantable” forests at almost 1,000,000 square miles, over one-third consisting of the exceptional timber of the Pacific slopes [142]. A similar proportion is shared by the three prairie provinces, the bulk falling to Manitoba where the forest-belt reaches farthest south [Fig. 89]; and Ontario owns most of the rest. Accessibility and superior transport facilities enable Ontario and Quebec to lead in output. Much wood is made into doors, windows and other articles for export; and spruce is made into wood-pulp for export and for use in Dominion paper-mills. In Ontario alone the number of wood-working and pulping mills now greatly exceeds 1,000. New Brunswick and Nova Scotia both contribute largely to the output. Other forest products include valuable furs and skins and tanning-barks. The **fisheries** are among the most valuable in the world [155], the annual “catch” being worth about £6,000,000. Nova Scotia and British Columbia each account for one-third, more than half the remainder being furnished by New Brunswick. Although three-fourths of the British Columbian catch is salmon¹ from the many sheltered fiords and estuaries, halibut and herring are also important. Eastern fisheries include cod,—of prime importance,—haddock, herring, mackerel, lobsters,

¹ British Columbian fisheries, except in salmon, are, unlike those of the east, still in their infancy, and capable of enormous development.

salmon, and oysters from sheltered Richmond Bay. The Lake fisheries of Ontario yield one-fifteenth of the total output.

523. **Minerals.**—Much of Canada being still unexplored, it is impossible even to estimate the total mineral wealth; but the known wealth is varied and enormous.

TOTAL £20,450,000
COAL 1/4
SILVER 1/6
NICKEL 1/10
GOLD 1/10
CLAYS 1/12
CEMENT 1/14
COPPER 1/15
ASBESTOS 1/35
ALL OTHERS

FIG. 90.—
CANADIAN
MINERAL
OUTPUT (1911).

The total annual output is well over £20,000,000 [Fig. 90], Ontario and Nova Scotia together contributing 70 per cent., and British Columbia 20 per cent. Taking **coal** first, as of prime economic importance, there are vast fields in Nova Scotia, both on the mainland and in Cape Breton Island, and round the Crow's Nest Pass in the Rocky Mountains both in British Columbia and in Alberta, each of these two latter fields being considered practically inexhaustible.¹ The Albertan field, "cropping out" along the banks of rivers, is particularly easy to work. British Columbia also owns large fields on Vancouver Island,² and on the Queen Charlotte Islands opposite Prince Rupert, the latter yielding the finest coal—both bituminous and anthracite—in the province.

Half of the total output is furnished by Nova Scotia, and one-fourth each by Alberta and British Columbia. A large field in New Brunswick is also drawn upon, and important deposits exist in western Manitoba and southern Saskatchewan; but, so far, the two most densely populated provinces—

¹ The Albertan field is calculated to contain 90,000,000,000 tons, and those of British Columbia still more, rather over half of the latter being anthracite. ² Mined at Nanaimo and Comox on the east coast.

Ontario and Quebec¹—appear to have no coal, and depend upon Pennsylvanian imports.

524. **Iron** is comparatively little exploited. In British Columbia—partly on Vancouver Island—are what may prove to be the richest deposits, but, like the vast field of fine ore in northern Quebec, they are still quite undeveloped. Ore is found in Ontario along the northern Lake shores, but, except near Kingston, it is said to be disappointing. Fine ore is mined along the Nova Scotian shores and in New Brunswick. **Copper**, general throughout Ontario, is worked only along the northern shore of Lake Huron—mainly at Algoma—and at Sudbury. There are rich mines near Rossland in British Columbia, and Nova Scotia and New Brunswick also contribute. Yukon has rich undeveloped deposits. **Gold** is found throughout the western highlands, British Columbia and Yukon² together leading in output. The chief fields are in the Cariboo region, in the upper Fraser valley; in the Kootenay region, in the upper Columbia valley; and round Dawson, in the upper Yukon valley. The Kootenay field is the most productive, Rossland being the main centre. Gold is widely distributed throughout Ontario, but little prospecting has been done and production is small. The Nova Scotian output is considerably greater.

525. Almost half of the **silver** is mined in Ontario, mainly round Cobalt. The richest mines elsewhere are in the Kootenay and Yukon regions, while ore also exists in Nova Scotia. Almost half of the world's **nickel** comes from the great Sudbury mines. **Cobalt**

¹ Area of Ontario, 365,880 square miles (=3 times Britain); population, 1911, 2,182,947. Area of Quebec, 690,865 (=6½ times Britain); population, 1911, 1,648,898.

² The output has fallen greatly with the exhaustion of alluvial supplies.

and **arsenic** are worked beside the Cobalt silver mines, and **asbestos** is mined at Thetford, in Quebec. **Phosphate** rocks are also found in that province. **Lead** and **zinc** are mined in the British Columbian highlands, and **quicksilver** at Kamloops, British Columbia, a fact of great importance to the Kootenay gold-field. **Petroleum** abounds in the Lake Peninsula, and round Edmonton in Alberta; while a source recently tapped in British Columbia is described as one of the largest in the world. **Natural gas** is a valuable asset, especially at Medicine Hat and Bow Island.

526. **Communications.**—The magnificent waterways of the **Great Lakes** [Fig. 91] cover an area almost half

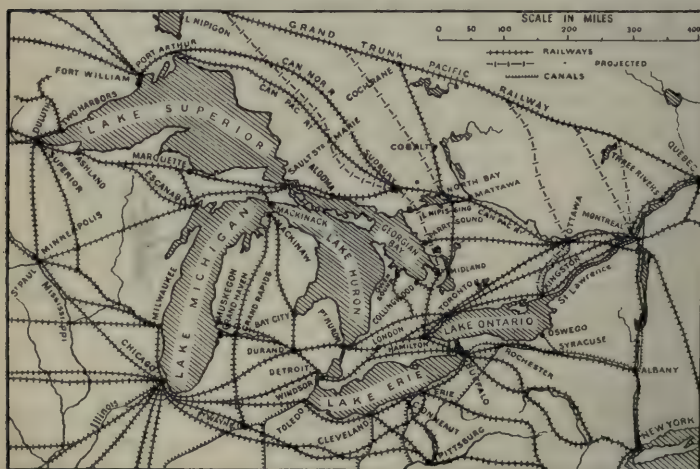


FIG. 91.—THE LAKE REGION.

that of the Mediterranean. By the St. Lawrence and its canals sea-going vessels drawing 14 feet reach Lake Superior, penetrating over 2,000 miles into the heart of the continent. The **Welland Canal**, surmount-

River and Assiniboine provide navigation through the richest prairie wheat-lands. The **Canadian Pacific Railway** [Fig. 92], opened in 1885, was the first Canadian trans-continental line, the distance from Montreal to Vancouver being 2,906 miles. The **Grand Trunk** line provides a direct and rapid route from Portland to Chicago *via* the Lake Peninsula. The **Grand Trunk Pacific** and **Canadian Northern** railways provide two new inter-oceanic routes. The **Hudson Bay Railway**, connecting the central provinces with Port Nelson on Hudson Bay, should play an important part in relieving the harvest congestion [518] and offer an advantage in distance and freight between the Far West and Europe, although its value will be largely limited to the summer and harvest months.

528. **Industries, Towns and Ports.**—**Sydney**, Cape Breton Island, with abundant coal and convenient limestone, has developed a great iron and steel industry with large ship-building yards, importing high-grade iron-ore from Newfoundland. **Louisburg**, the winter port, is reached by rail. **Halifax** (46,619), with a splendid natural harbour never icebound, handles most of the winter trade of Montreal. **Lunenburg** and **Yarmouth** have a large dried and salted fish export. **St. John** (42,511), New Brunswick, with a splendid harbour, never closed, exports cattle, cheese, butter and timber products, its saw-mills being the largest in the province. **Fredericton**, the capital, accessible by large vessels, owes its important leather industry to convenient pastures and tanning-bark from the forests. **Charlottetown**, Prince Edward Island, with extensive lobster and other fisheries, has a deep, sheltered harbour and a large live-stock trade.

529. **Quebec** (78,190), though suffering through the

development of Montreal, has a vast lumbering and pastoral hinterland and, with enormous local supplies of hides and tanning-bark, one of the greatest leather industries in North America—boots and shoes being the special product. Tadoussac, at the Saguenay mouth, with large pulp-mills up the river at Chicoutimi and a rich forest and agricultural region round Lake St. John, will become a port of note; and Three Rivers, with a rich forest hinterland and abundant water-power not far inland, is a rapidly-rising timber-port. **Montreal** (470,480), the chief industrial centre and largest city, at the head of ocean navigation on the St. Lawrence, is the natural port for the great agricultural and industrial province of Ontario, and the ocean gate of the Dominion. Like Quebec, it has developed a great leather industry, the chief special product being harness; and its iron and steel works, though consuming imported coal, are the largest in Canada, producing locomotives, steel rails, agricultural machinery and implements, and cutlery. Converging railways and canals are increasingly emphasising its importance. The winter trade, owing to the closing of the St. Lawrence, is conducted through Halifax and Portland by direct rail. The main exports are wheat, flour, cattle, cheese and timber—the last chiefly from Ottawa.

530. **Ottawa** (87,062) owes its existence to the Chaudière Falls, whose power drives the largest saw, wood-working and pulping mills in Canada. **Cobalt** is a great mineral centre surrounded by rich agricultural land; and **Sudbury**, with its great copper and nickel mines, is an important railway junction. **Kingston** and **Hamilton** (81,969), with important ironworks using local ore, and **London** (46,300), with oil-refining, flour-milling and tanning industries, all import Pennsyl-

vanian coal and manufacture coarse cottons and woollens; so also does **Toronto** (376,538), with its splendid harbour, many railways and iron and cement industries. At Midland and Collingwood on Georgian Bay there are now important ship-building yards; and Owen Sound ships grain and other Peninsular produce. The proximity of the forests to the "power" of the rapids has created a great pulp industry at **Sault Ste. Marie**, where also steel rails are now largely made. **Port Arthur** and **Fort William**, the great grain ports, have rapidly-growing iron and steel industries (including ship-building yards) and general manufactures.

531. **Winnipeg** (136,035), at the junction of two navigable rivers where the forest-belt originally met the prairie, naturally grew as a great fur and grain market; and its importance, without a rival over a vast area, "commanding" the passage from west to east between the forested lakes and the American frontier, compels the attention of all railways passing through the province; while even American lines reach it *via* the Red River valley, which contains some of the richest wheat-land in the world. Other rapidly rising Manitoban centres are Portage la Prairie and Brandon. **Regina** (30,213), the capital of Saskatchewan, at the junction of the prairie with the "ranching" west, has developed mainly as a live-stock and meat market; while **Saskatoon** is a busy railway centre. Other rising towns are Moose Jaw; Maple Creek, a great cattle-market on the southern coal-field; Battleford and Prince Albert.

532. Flour-milling and brewing are important at **Calgary** (43,704) and **Edmonton**, both having convenient coal; and recently-founded meat-packing establishments are already giving an impetus to stock-rearing. Calgary has also a special coke and briquette

industry. **Lethbridge** has flour-mills and breweries, and **Medicine Hat**, at the junction of the two Canadian Pacific branches, will benefit greatly by its natural gas reserves. Sugar-refineries at Raymond consume the fine and increasing beet-crop. **Victoria** (31,660), on Vancouver Island, is the British Columbian capital. The sheltered island harbour of **Esquimalt** is its port—

one of the finest natural Pacific harbours, an important coal-depôt, and a great copper-smelting, iron- and steel-working and ship-building centre using convenient iron and copper ores from the mainland. It trades largely in salmon from neighbouring centres and furs from

Alaskan islands, and owns the largest graving dock on the coast. **Vancouver** (100,401) has a splendid, deep harbour, and abundant timber and water-power have given it great saw-milling and pulping industries. **New Westminster**, with an excellent harbour and plentiful water-power, has developed a special canning industry in salmon and pears. **Prince Rupert**, the Grand Trunk Pacific terminus, will become one of the chief ports on the coast.



FIG. 93.—CANADA: FOREIGN TRADE.

The Skeena River will yield it an abundant salmon harvest, and there is a rich halibut ground off the Queen

Charlotte Islands with their vast coal-fields; while on the mainland is an untold wealth of timber and minerals. It will also benefit by the opening of the Panama Canal [534].

533. The expansion of the **foreign trade** [Fig. 93] generally has been rapid. Perhaps the most noticeable feature is the large **excess of imports over ex-**

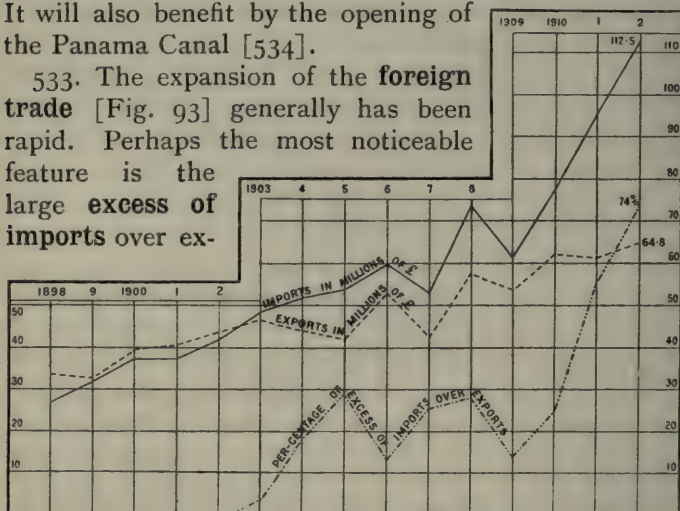
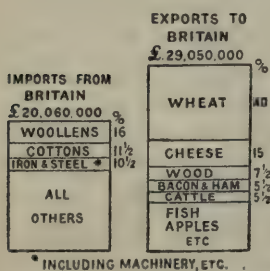


FIG. 94.—CANADA: EXCESS OF IMPORTS.



* INCLUDING MACHINERY, ETC.

FIG. 95.—CANADIAN TRADE WITH BRITAIN.

ports, due to the importation of heavy purchases paid for by British capital on behalf of Canadian concerns. The excess dates from 1903 only [Fig. 94], but its great increase since 1909 indicates the extent of the Canadian "boom." Comparatively unimportant export items giving promise of considerable increase are fruit, hay, hides and skins, and bacon and ham. The export of agricultural implements is also increasing. Canada is the largest cheese exporter [153], but the value has not recently increased.

534. **The Future.**—In every province there are still vast stretches of excellent unoccupied agricultural land. Valuable timber still covers it in the east, but in Saskatchewan and Alberta there are **millions of acres ready for occupation.** With the present rapid railway extension agricultural development should continue at an increasing rate. This implies a steadily-increasing demand not only for meats and dairy products, but for manufactured goods of all kinds, thus stimulating industries in the east and doubtless inducing industries on the rich western coal-fields and in British Columbia. The opening of the **Panama Canal** will greatly affect commerce. It will bring Pacific ports within convenient reach of Europe. Wheat and other western produce will be economically exported from both Vancouver and Prince Rupert, machinery and other manufactured goods from Europe forming return shipments. It will also make Pacific ports more accessible to Atlantic ports; even now it is found worth while to ship goods from Halifax and other eastern ports to British Columbia (*a*) *via* Mexico, involving a double transshipment in that country, and (*b*) by the longer sea route round Cape Horn.

535. A “**reciprocity**” treaty between Canada and the United States has been much discussed, and although, so far, no arrangement has been made, eventually some agreement of the kind will be arrived at. It is important to the industrial development of the Dominion that she should have free recourse to American machinery, and it is equally vital to the United States that she should be able to import cheaply such Canadian products as wood-pulp.

NEWFOUNDLAND

Area, 42,734 square miles ($=\frac{1}{3}$ Britain) ; population, 1911, 238,670.

536. With Newfoundland is associated the tundra coastal strip of Labrador, practically equal in area to Britain, on the inland border of which are large peat deposits and vast forests. The colony, which preferred to remain outside the Dominion when given the opportunity of joining it, has a rugged and deeply-indented coast, and an interior consisting largely of barren uplands relieved by timbered valleys and fertile areas not yet made accessible by rail; the proximity of vast fishing-grounds along the coast and on the Grand Banks south-east of the island [155] thus naturally made it primarily a fishing community. The richness of the fisheries yields an export of dried and salted fish—mainly cod—to the annual value of over £1,500,000.

537. The chief agricultural products of the cool, moist climate are potatoes and turnips, and many horses, cattle, sheep and swine are reared. Cultivation is increasing as railways extend. Pine forests support saw-mills in northern valleys, and important pulping and paper mills with promise of wide development utilise water-power—*e.g.*, at Grand Falls. Minerals are plentiful, but iron and copper alone are appreciably worked. Rich eastern mines support iron and engineering industries at St. John's (32,292), the capital, but much of the ore is exported to the furnaces of Sydney, Cape Breton Island [528]. A railway, now connecting St. John's with a large western coal-field—really an extension of the Cape Breton field [523]—may induce the growth of metal industries. Gold, silver and lead are all found in the east. Fish and iron form two-thirds of the total **exports**, the only other prominent items being fish and seal oils, copper ore, wood and

timber. **Imports** are naturally varied, including flour, textile goods, meats, ironware and machinery, coal, railway materials, sugar and oil. One-fourth of the total trade is with Britain, one-fourth with Canada, and one-fifth with the United States.

THE UNITED STATES

Area, 2,973,890 square miles ($=24\frac{1}{2}$ times Britain); population, 1910, 91,972,266, including 9,827,763 coloured or negroes ($=$ twice Britain).

538. Originally, like Canada, essentially agricultural, the United States has become in an incredibly short time the **first manufacturing nation** in the world. This revolution was made possible by an enormous wealth in easily-mined coal and iron, abundance of cheap raw material and a rapidly-expanding home market [Fig. 96]; and it was greatly assisted by abundant capital, great inventive and organising skill and a high protective tariff. The importance of the home market is best realised by considering that all but one-sixteenth of the manufactures are consumed at home, although the total output is more than twice that of Britain. America is also exceptionally **self-sufficing**, with almost every variety of climate from temperate to tropical.

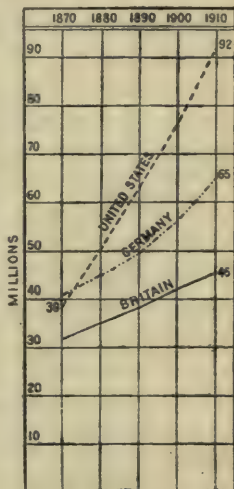


FIG. 96.—UNITED STATES: INCREASE OF POPULATION.

539. **Agriculture** is still much the most important occupation, engaging one-ninth of the entire popula-

tion; while industries depending upon it employ one-eighth of the industrial "hands." **Maize and wheat** are the two chief grain-crops, the former covering more than twice the wheat acreage and yielding a crop more than four times as large [Fig. 97]. The production and export of both grains have already been discussed [63-66; 69], as well as the competition between the two crops where their respective belts of production overlap [69-70]. Central climatic conditions show a gradual transition from the "wheat" climate of

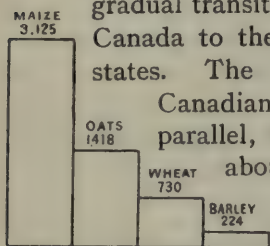


FIG. 97.—UNITED STATES:
GRAIN CROPS IN 1912 (IN
MILLIONS OF BUSHELS).

Canada to the "cotton" climate of the Gulf states. The wheat belt extends from the Canadian frontier almost to the 36th parallel, the maize belt extending from about the 44th to about the 32nd.

North Dakota raises more than twice as much wheat as any other state except Kansas, and Minnesota, South Dakota and Nebraska follow; the heaviest

maize production extends from Nebraska and Kansas southward through Oklahoma to Texas, and eastward through Iowa and Missouri to Ohio and Kentucky, the largest producers—Kansas, Iowa and Illinois—each raising more than twice as much as any other state except Missouri.

540. Wheat is important in the Pacific states, Washington raising as much as South Dakota. It is also prominent in "dry" western states—particularly Montana, Idaho, Utah and Colorado—formerly considered incapable of anything but stock-rearing, where rich "desert" land is still being reclaimed by irrigation, and scientific dry-farming is working wonders where irrigation is impossible. **Oats** cover a somewhat less

area than wheat, but the yield is about double [Fig. 97]. The belt of largest production extends from the Dakotas and Nebraska to New York; smaller crops, though still considerable, are raised in Oklahoma and Texas, in the four "dry" states mentioned, and in the Pacific states. The chief **barley**-growing states are the Dakotas, Minnesota and Wisconsin, and the Pacific states—notably California, the crop being mainly used for brewing. **Potatoes** cover the largest area after barley, production being widely spread. **Rye** and **buckwheat**—the former mainly for the making of whisky—are comparatively unimportant.

541. **Rice** is grown on hot, swampy lowlands in Louisiana and Texas, which between them furnish almost half the country's requirements, irrigated fields along the Mississippi banks in Arkansas also contributing. The **sugar-cane** is characteristic of the Louisiana swamps, which yield 95 per cent. of the output, Texan plantations raising most of the rest. The growing of **sugar-beet** is rapidly extending. Half of the entire crop comes from Utah, Michigan raising almost one-third as much; Nebraska, New York and California follow. **Fruit**-growing is widespread. In the north-east and Michigan the peach is a special product; hot Florida grows oranges and pineapples; and oranges and other typical "Mediterranean" products thrive in California. One-third of the export is apples.

542. The United States is the largest **stock-rearing** land in the world, for cattle and sheep, and the largest slaughtering and meat-packing industry in the world has grown up in the central states because of (a) their intermediate position between western ranches and eastern markets, and (b) their rich maize and hay crops, Chicago, Kansas City, Omaha and St. Louis being the

chief centres. Cattle-raising is an altogether special industry in Texas, the vast natural grazings supporting twice as many cattle as are found in any other state but Iowa. Elsewhere the industry is most prominent in the maize belt, to which ranch-fed cattle come to be fattened for slaughter. Most of the live cattle and nearly all the chilled meat exported come to Britain; the canned-meat industry has declined with the advent of refrigeration.

543. Hogs are also most important in the maize belt, that grain forming the best food. Hog products—ham, bacon, pork, lard, etc.—are turned out almost mechanically in enormous quantities. Most of the exports come to Europe, Britain being the chief consumer. Sheep are raised mainly for wool, but the coarseness of the western grazing and its richness in the centre and east produce distinctly inferior fibre. Sheep-rearing is most prominent in the “dry” states, Montana having by far the largest wool-“clip,” followed by Wyoming. Many sheep are also raised in Michigan and Ohio, Oregon and California. Mutton—mainly consumed at home—is important in the slaughtering states. Horses are most numerous from Nebraska to Texas and eastward through Iowa and Missouri to Ohio, smaller numbers being raised in other oat-growing states; and many mules are reared in the centre and west and in Georgia and the Carolinas, Texas raising more than twice as many as any other state. Rich alfalfa-crops (lucerne) in the “dry” states support an increasing number of ostriches—particularly in Arizona.

544. The advantages of **mixed farming** led long ago to its general adoption wherever possible (*cf.* § 517), the demand of slaughtering centres for live-stock providing an additional inducement. Widespread grain-

production and the demand for poultry and eggs also induced extensive poultry-farming, which now supplies the entire home demand. **Dairying**, naturally associated with mixed farming, is important nearly everywhere. The consumption of milk in the populous east leaves little for making butter and cheese, which therefore come mainly from the west, where co-operation has not developed. Cheese exports have fallen off in competition with the finer product of the more highly organised Canadian industry [521]. **Market-gardening** has developed extensively in eastern states, the wide range of temperature, with the aid of cheap and rapid railway transport and co-operative collection and forwarding, enabling the south to supply the north with out-of-season products and *vice versa*.

545. **Cotton** has been already discussed [98-107]. It covers three-fourths as much land as wheat, and is the most valuable crop after maize. The finest "Sea Island" fibre comes mainly from the Georgian coast. Texas is the largest producer, yielding one-fourth of the total output; Georgia is the second producer in quantity and the first in value. Alabama comes third, followed by South Carolina and Mississippi. **Tobacco** is very valuable, America being the largest grower [139]. Many eastern states, from Wisconsin to Florida, grow it extensively; but the area of largest production, where the finest pipe and cigarette varieties are grown, extends from Tennessee and North Carolina to central Ohio and Maryland. The leaf of the hotter south is more suitable for cigars, which are made in Florida. Kentucky raises over one-third of the entire crop, Virginia and North Carolina together producing about one-fourth. **Flax** is grown for seed [112], especially in Minnesota and the Dakotas, the fibre being poor.

546. **Forest Products.**—Almost half of the Union was originally forested, and three-fourths of this enormous timber-supply has been either cut down or destroyed by forest fires. The most valuable timbers—pine and spruce—are approaching exhaustion except in western forests, supplies from which could not compete in the east with imported timber owing to cost of transport. Northern forests from the Wisconsin and Michigan uplands to the Alleghanies and Maine yield chiefly soft coniferous woods, the most notable being **white pine**, which, being non-resinous, soft, and easily worked yet strong, is in enormous demand for building purposes, and accounts for one-fourth of the entire timber output. Red pine, though harder and stronger, is more resinous and less widely useful. Spruce and hemlock, the former being the main source of wood-pulp and the latter supplying valuable tanning-bark, prevail in the north-east. Among harder southern woods [143] may be mentioned (*a*) the beech, hickory, and white oak of the central states, the last being demanded for casks, tool handles, the wooden parts of machinery, and other commodities calling for hardness combined with strength; (*b*) the walnut, swamp-chestnut and basket-oak of the south, the two last being special products of swampy regions. In the south also are obtained cedar (for pencil-making and other purposes) and cypress. The yellow pine, covering extensive sandy stretches on the Atlantic plain and in the south, is specially important for the manufacture of turpentine, tar and pitch (“naval stores”). Western forests have a great variety of timbers, mainly coniferous, including the Douglas fir of the Pacific coast.

547. **Lumbering** and its attendant industries employ as many hands as agriculture, satisfying the enormous

home demand and furnishing a large and still rising export [145]. Wood and its manufactures, also imported, represent mainly cheaply-produced pulp and pulp-wood from Canada which, despite the heavy import duty, compete with increasingly-scarce home supplies. It is said that the annual timber-cutting represents three times the rate of growth, so that nothing can prevent early forest-exhaustion but afforestation on a gigantic scale. Washington became the first lumbering state in the Union in 1905.

548. The yield of the **fisheries**, about £11,000,000, is almost twice that of Canada and almost equal to that of Britain. Massachusetts and Maine, like New Brunswick and Nova Scotia, have enormous catches of cod, herring, haddock and mackerel; farther south the shad replaces the herring. Lobsters are a special product—but declining—as far south as Delaware, and the sheltered eastern bays contain extensive beds yielding the largest and finest oysters.¹ Sponges are typical of the warm Floridan waters. The salmon and halibut fisheries of Washington and California are important (*cf.* British Columbia). Lake Michigan is the chief scene of the whitefish and sturgeon Lake fisheries.

549. **Mineral products** [Fig. 98] attain two-thirds of the value of the maize-crop, **coal** being much the most important. About one-sixth of the Union is coal-bearing, and it is now the chief producer [158]. The Appalachian is the largest field, extending from Pennsylvania to Alabama, and yielding two-thirds of the output. Coal here lies so near the surface that river erosion has exposed great seams for enormous distances along the banks, direct loading into barges making production

¹ Chesapeake Bay and Long Island are the chief sources.

TOTAL £ 383,600,000
COAL $\frac{1}{3}$
IRON $\frac{1}{6}$
COPPER $\frac{1}{14}$
PETROLEUM $\frac{1}{14}$
GOLD $\frac{1}{20}$
STONE $\frac{1}{25}$
GAS $\frac{1}{25}$
CEMENT $\frac{1}{30}$
LEAD
SILVER
ZINC
ALL OTHERS

FIG. 98.—
UNITED STATES:
MINERAL
OUTPUT (1911).

cheap.¹ The central field, covering much of Illinois, Indiana and Kentucky, yields one-sixth as much, and the western field, in Iowa, Missouri and Kansas, rather less. There are large fields in North Dakota and Michigan, and many smaller in the "dry" states (from Montana to Texas), Oklahoma, Arkansas and the Pacific states. All these yield only soft or bituminous coal, which forms about three-fourths of the output. The only **anthracite** occurs in eastern Pennsylvania, in the Schuylkill valley, satisfying nearly all the country's domestic requirements and steamship demands at various ports. Pennsylvania thus leads with one-sixth of the total coal-yield, Illinois, West Virginia, Ohio and Alabama following. **Petroleum** production has been dealt with [162]. The output of Ohio and Pennsylvania is now exceeded by California, Oklahoma, Illinois, and West Virginia. Texas and Louisiana also contribute. **Natural gas** is obtained from New York to Kansas, one-fourth of the yield being obtained in Pennsylvania. It is estimated that the oil reserves will be exhausted by the middle of the present century, and the gas reserves even earlier.

¹ Transport by river is also cheap, particularly down-stream, a single stern-wheel steamer sometimes pushing a fleet of connected barges conveying as much as 60,000 tons of coal.

550. **Iron** production has also been dealt with [164-166]. American ore is mostly very pure, and in the upland mines south and west of Lake Superior—yielding two-thirds of the total output—it occurs on the surface and is cheaply mined, steam shovels loading it direct into trucks. The rest of the output is nearly all furnished by the Appalachian field, mainly in Pennsylvania and Alabama. **Copper**, of which the Union is the chief source [169], is found pure in great quantities on the Keeweenaw Peninsula on the south shore of Lake Superior, but it is more commonly found as ore, the famous Butte and Anaconda mines in Montana being the chief sources, and Arizona contributing substantially. The highly-developed smelting industry consumes much imported ore as well as home supplies. **Zinc** is alloyed with copper to make brass. Nearly half the production is in Missouri, the zinc belt stretching through Kansas and Oklahoma to New Mexico and Utah. Much is also mined in New Jersey.

551. The chief **gold** mines [168] are in the western highlands, notably in Colorado and California. The **silver** mines of Colorado, Montana, Utah and Idaho are the chief sources in the Union. Almost half the **lead** is furnished by Missouri, but the demand requires considerable imports—mainly from Mexico. **Building-stones** abound in most eastern and western highland states, some of which yield also **granites** and **marbles**. **Cement** and various brick, tile, pottery and china **clays** are widely distributed. Rich **phosphate rock** deposits occur in Florida, Tennessee, and Wyoming. The Union is conspicuously lacking in tin, which is largely imported to make tin-plate for the many great canning industries.

552. **Communications**.—Apart from the Great Lakes,

which have already been described [526], the outstanding feature of inland waterways is the Missouri-Mississippi system, which, with its many great tributaries, furnishes over 9,000 miles of navigation through rich agricultural, mineral, and industrial country. The Hudson is navigable by large steamers for 100 miles,



FIG. 99.—THE UNITED STATES: CHIEF RAILWAYS.

and by smaller vessels to Albany, whence Buffalo may be reached by the Erie Canal or Montreal by the Champlain Canal. The former canal has largely fallen into disuse through the efficiency and cheapness of railway transport. Most Atlantic rivers are navigable to the "fall line" [513]. Of Pacific rivers, the Columbia is navigable for 500 miles, the Willamette for 125, the Sacramento for 150, and the San Joaquin for 100. The

eastern half of the Union is covered with a network of **railways** which has no counterpart in the world. All great inland centres communicate with the various Atlantic and Gulf ports, and, by six great trans-continental lines, with Pacific ports [Fig. 99]. Competition and high organisation have made transport so efficient and cheap that the American system stands alone as an example of what railways can accomplish.

553. **Industries.** — **Textile manufactures** employ more people than any other occupation but agriculture. **Cotton goods**, the chief product, consume one-third of the vast cotton crop. They were first made in the New England states, where a sufficiently moist climate, plentiful water-power and cheap fibre from the south, aided their production just where they were wanted; and cheap Pennsylvanian coal and convenient access to growing interior markets enable those states to maintain their predominance over rapidly growing industries in southern states, with their water-power, coal, cheap labour, local cotton and markets. Massachusetts is the chief state, Fall River being the first centre and Lowell the second. **Woollen goods** follow cotton, their production being even more emphatically centred in the New England states, which draw convenient wool supplies from inland pastures. The home fibre output, though large, requires supplementing by Australian, British and Argentine imports; and convenience for distribution has made Boston the great central wool-market. America is the largest maker of woollen carpets, more than half being produced at Philadelphia, owing to the exceptional purity of the Schuylkill water.

554. In **silk** manufacture America is now second only to France [126]. New York, New Jersey and Pennsylvania lead, and the enormous raw import has made

New York the greatest silk market in the world after Shanghai. Paterson (New Jersey) is the "Lyons of America." **Machine-knit goods** of all kinds are made in enormous quantities wherever yarns are produced, *i.e.*, from New England to Alabama. **Ready-made clothing** is a great industry also fed by textile mills, but not hampered, like spinning and weaving, by dryness of climate, so that its distribution is wide. Most great cities participate, notably New York, Philadelphia, Boston, Baltimore, Chicago, Cincinnati and Rochester.

555. **Industries : Iron and Steel.**—**Coke**, the chief smelting agent, is made in greatest quantities at Connellsville. Up till 1890 iron and steel imports exceeded exports in value; now the former are but one-fifth of the latter, which continue to grow (*cf.* Fig. 36). America makes over 40 per cent. of the world's pig-iron, and over 45 per cent. of its steel. The greatest output of **raw iron and steel** is in western Pennsylvania and eastern Ohio, where vast coal-fields, convenient limestone, proximity to markets and cheap transport have attracted rich, cheaply-mined ore from Lake Superior, where neither coal nor limestone exist. The ore comes mainly to Cleveland, Conneaut, Erie and other ports on Lake Erie, whence trains convey it to the furnaces—two-thirds of it going to Pittsburg—and bring in return coal and coke for Superior ports. Much ore is also attracted to Chicago by the neighbouring coal-field. Round Birmingham, Alabama, a great industry has grown through the juxtaposition of excellent ore, coal, limestone and markets.

556. **Machinery** is the most important steel product, the precise form being dictated by local facilities and requirements. Textile machinery is a special product at Providence (Rhode Island) and Worcester (Massa-

chusetts); milling machinery at Buffalo and Erie; meat-packing machinery at Chicago, St. Louis and Cincinnati; and agricultural machinery and implements at Buffalo, Cleveland, Erie, Cincinnati, Louisville and—above all—Chicago. Owing to the spread of railways the manufacture of **locomotives** has grown rapidly—Philadelphia, Pittsburg and Chicago being specially prominent. Making and repairing of **railway cars and wagons** is prominent in nearly every state. **Ship-building** is meantime comparatively unimportant. The chief yards are in Delaware Bay, at Philadelphia and Wilmington; in Chesapeake Bay, at Baltimore, Sparrow Point and Newport News; at Bath (Maine), San Francisco, Superior and Cleveland.

557. Perhaps the most notable feature of American machinery is the almost universal use of **interchangeable parts**, the making of which is in itself a vast industry in which New York, Philadelphia and Chicago lead and most other “machinery” towns share. **Tin-plate** is made in most “metal” towns for the various great canning industries; **brass** is made and rolled mainly in Connecticut, where water-power and zinc are convenient; and all great centres from Boston to Chicago make finished brass and copper wares. Various special industries include the making of motor vehicles, cycles, clocks and watches (in the Connecticut “brass” region—notably at Waterbury and Ansonia), sewing-machines and typewriters.

558. **Industries dependent upon Timber.**—**Wood-pulp** is made from spruce, mainly in the New England states, Wisconsin and Oregon, where paper is also largely made. The New England states, with the additional benefit of abundant textile “waste,” lead in paper output, Holyoke (Massachusetts) being the chief

centre. Yellow pine supports the manufacture of **turpentine, tar and pitch** in many Atlantic ports, Wilmington, Newbern and Beaufort leading. **Coopering** is naturally most prominent in the great flour and sugar centres. **Furniture** is made from local timbers in most great cities, notably at New York, Philadelphia, Chicago, Grand Rapids, Muskegon, Memphis, Montgomery and Mobile. **Tanning**, fed by hides from the slaughtering centres, increasingly supplemented by South American imports, is concentrated in the north-eastern "hemlock" states, where Philadelphia has the largest leather industry in the world, followed by Rochester and New York and—more recently—Chicago and Cincinnati. The largest and most highly organised **boot and shoe industry** has developed round these "leather" cities and other great centres, *e.g.*, St. Louis, which specialises in women's footwear. North-eastern states furnish two-thirds of the output.

559. **Food Industries.** — Slaughtering and fishing have already been mentioned. Canning is important, and depends upon many different products. **Meat-canning** is still prominent at the great slaughtering centres, and in Maine and New York; **fruit-canning**¹ is important in fruit-growing states, the export of canned peaches, pears and apricots being large despite the growing export of fresh fruit—mainly from California—by cold storage; and **fish-canning** is extensive, canned salmon from Pacific and north-eastern states forming the chief fish export, while sardines are canned in the north-east and oysters—especially at Baltimore—despite the development of cold storage. **Fish-curing** is important in the north-east, mainly for home consumption. The salting of cod is specially prominent at Gloucester (Maine), the chief fishing port.

¹ Certain vegetables, *e.g.*, peas, beans and tomatoes, are also canned.

560. **Flour-milling** is most prominent in the dry central climate, and Minneapolis (301,408), the world's greatest milling centre, grew where the falls of St. Anthony provided power at the eastern edge of the great wheat region, and at the head of navigation on the Mississippi. Superior, with its vast wheat hinterland, and Buffalo, with its enormous wheat-receipts and electric power from Niagara [43], are other important milling centres. Much wheat is exported as flour, especially to lands where milling is insufficiently developed or the climate insufficiently dry. **Sugar-refining**, owing to the narrowness of the margin between prices of raw and refined sugar, can flourish only by the aid of the economies of large-scale production. Great sugar-refineries are generally found (a) near the plantations, or (b) at centres, generally sea-ports, to which raw material may be cheaply conveyed. Refining is most important at New York, Philadelphia, Boston, Baltimore, New Orleans and San Francisco, using both cane and beet, the home crops being supplemented by imports. **Maple-sugar** is a special product in Vermont, New York, Pennsylvania and Ohio.

561. **Other Industries.**—Clays support brick and tile works in most states, finer clays giving rise to potteries in several; while the momentum of an early start has made the potteries of Trenton (New Jersey) and East Liverpool (Ohio) the largest in the Union. Suitable glass sand is found nearly everywhere, but especially from Missouri to West Virginia and Pennsylvania, and in the north-east. Two-fifths of all the glass is made in Pennsylvania. Chemical industries support dye-works in "textile" states, fertiliser-factories in agricultural states, and oil-refineries at Lake and Atlantic ports, *e.g.*, Cleveland, Buffalo, New York,

Philadelphia and Baltimore, to which the oil is conveyed from the Pennsylvanian field by pipe-lines. Most wine consumed is now home-made, about half being produced in California and most of the rest in Ohio and New York; and wine is even exported to Europe, China and Japan. Tobacco manufactures are a special feature at Richmond (Virginia), supplying three-fifths of the large export; other notable centres are Petersburg and Lynchburg in that state, Wheeling (West Virginia), and Durham (North Carolina). Fine cigars are made—mainly from Cuban leaf—at Key West and Tampa in Florida. One-third of the large rubber import [Fig. 25] is made into boots and shoes—mainly in Massachusetts, Rhode Island and Connecticut.



FIG. 100.—ENVIRONS OF NEW YORK.

NEW YORK	
	46½%
NEW ORLEANS	5¾%
GALVESTON	5¾%
BOSTON	5%
PHILADELPHIA	4%
BALTIMORE	3%
SAN FRANCISCO	2¼%
ALL OTHERS	
	27¼%

FIG. 101.—SHARE OF CHIEF PORTS IN TOTAL TRADE.

562. **Chief Cities and Ports.**—New York (4,766,883), with a river frontage on either side of Manhattan Island [Fig. 100] which would enable the 90 miles of

wharves to be multiplied many times, owes its importance to (a) its deep, sheltered harbour; (b) its nearness to Europe; (c) its easy access inland by the oldest and best route *via* the Hudson and Mohawk valleys; and (d) its command of raw material, *e.g.*, timber (chiefly spruce), hemlock-bark and hides, and, later, of all kinds of manufactured goods from neighbouring cities and general produce from the interior. It is the chief port [Fig. 101], handling practically half the foreign trade; the second city in the world after London; and the third port in the world after London and Liverpool.

563. **Boston** (670,585), the chief Atlantic port after New York, is nearer Europe, but shut off by hills from the Mohawk valley route inland, to which, however, a railway tunnel now gives access. It has a hinterland exceptionally rich in water-power, and easy access to both Montreal and New York; and has grown mainly as a receiving and distributing centre for the many north-eastern industrial cities—cotton, wool and hides forming the main imports. It has developed a special publishing industry in connection with the paper of Holyoke. Like New York, it is a great spruce market; it receives and distributes most of the salted cod of Gloucester; and it follows New York as an exporter of wheat. **Philadelphia** (1,549,008), at the head of Delaware navigation, commands the excellent Susquehanna valley route inland. Convenient anthracite, wool, skins and hemlock-bark explain its predominance in woollen and leather industries, those, with others, combining to make the city the chief manufacturing centre in the New World. **Baltimore** (558,485), 140 miles up Chesapeake Bay, commanding the Potomac valley route inland, offers a more convenient outlet than

New York for much Mississippi valley produce, shipping maize, wheat, flour and tobacco.

564. **Wilmington** (87,411), **Charleston** (58,833), **Savannah** (65,064) and **Jacksonville** (57,699) all export cotton, yellow pine and its products—turpentine, tar and pitch. **Pensacola** is the chief Mexican Gulf fishing port, with a large timber export. **Mobile** (51,521) exports cotton extensively, as well as tobacco and timber. **Galveston** is raised by its enormous Texan cotton export to the dignity of the third port, and its accessibility from San Francisco brings it much overland Pacific traffic for re-export. Important harbour improvements are being made. **New Orleans** (339,075), 107 miles up the Mississippi, is the second port and the greatest cotton and wheat port in the world, being the natural outlet for much of the Mississippi valley and for western “grain” states for which Atlantic ports are too remote. It is the chief cypress market, and its exports—half going to Britain—include cotton-seed oil, maize, flour and tobacco.

565. **San Francisco** (416,912), with the only natural harbour between the Columbia mouth and the Mexican frontier, the sole seaward outlet for the rich valley—almost equal in area to Ireland—watered by the Sacramento and San Joaquin rivers, enjoys a situation of unique importance; and the opening of the Panama Canal should mean much to it [534]. Its “Mediterranean” hinterland, completely sheltered by the coastal range, raises the finest table-grapes, peaches, pears, apricots, oranges and lemons, as well as most grains—including wheat. Wine, beer, salmon and lumber are products rapidly increasing in importance. Expensive rail-transport eastward emphasises the importance of the harbour. **Seattle** (237,194) and **Tacoma** (83,743),

the termini of the two most northerly trans-continental lines [Fig. 99], chiefly export timber, **Portland** (207,214) handling mainly wheat. **Los Angeles** (319,198), deriving electric power from falls over 80 miles distant, is rapidly assuming industrial importance.

566. **Buffalo** (423,715) receives grain and lumber, mainly from Lake Superior, its distinctive industry being flour-milling. Most of the grain and flour is entrained for export *via* New York. **Cleveland** (560,663) has many industries, including ship-building. **Duluth** (78,466) and **Superior** are the largest grain-markets after Chicago, collecting and shipping grain from a vast hinterland. Both have growing iron and steel industries supported by Pennsylvanian coal [555], and Superior is the greatest flour-milling centre after Minneapolis. **Milwaukee** (373,857), a great industrial city, also collects and ships grain. **Detroit** (465,766) commands traffic passing between Lake Erie and the upper Lakes as well as that crossing to the Lake Peninsula of Canada. **Pittsburg** (533,905), the largest iron and steel centre in the world, arose at the junction of two navigable rivers. Local iron-supplies, long since exhausted, are now replaced by imported Superior ore [555]. Natural gas supplies, though now approaching exhaustion and too costly for general industrial use, are still of special advantage in the great glass-making industry, in which purity of fuel is vital.

567. **Chicago** (2,185,283), the second city, stands where the great grain and live-stock regions meet the Lake navigation and where northern railways "round" the southern end of Lake Michigan to pass east and west. These great natural advantages have been emphasised by the flatness of the surrounding prairie, which not only enables the city to communicate by

canal and river with the Mississippi navigation, but favoured the convergence of railways from all directions [Fig. 91]. Chicago has thus become the greatest railway centre as well as the greatest grain, live-stock and meat market, not only in the Union, but in the whole world. It is also the greatest lumber market in the world, its chief interest being white pine [546].

568. **St. Louis** (687,029), the fourth city, centrally placed on the level prairie between eastern and western highlands and between the Lakes and the Mexican Gulf, and surrounded by grain, cattle, cotton and tobacco regions, has also become a great railway centre, an important focus for collection and distribution, and a prominent manufacturing city. It commands navigation up and down the Mississippi and up the Missouri, being for long the lowest point at which the former was bridged. It is the chief white oak market [546], and conducts most of the foreign trade with Mexico. The competition of many equally convenient routes to Atlantic and Gulf ports ensures favourable freight rates. **Kansas** (330,712), between maize, cattle and cotton, is the greatest live-stock market after Chicago, and its leading industry, after slaughtering and meat-canning, is the making of cotton-seed cake [106] for animal-fattening; while abundant grain and the dry climate make it one of the greatest egg markets.

569. The **Foreign Trade** [Fig. 102] is larger than that of any other land but Britain and Germany. Two-fifths of the export to Britain consists of raw cotton, and one-eighth of live-stock and meat products; while other leading items are leather, petroleum, tobacco, copper, machinery, fish and paraffin wax. The chief imports from Britain are textiles, iron and steel wares, and a great variety of other goods, including wool and other colonial produce.

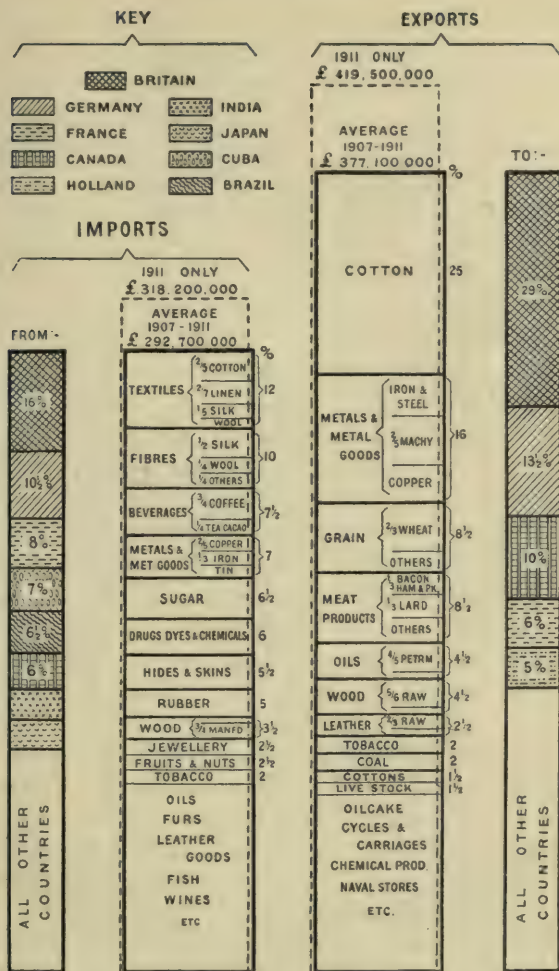


FIG. 102.—UNITED STATES: FOREIGN TRADE.

570. **The Future.**—The further expansion of agriculture will be practically confined to (a) central

forested land now being gradually "cleared," and (b) western lands secured by reclamation [540]; but the chief development will almost certainly be the result of more intensive cultivation, by which, it is claimed, practically every crop might be at least doubled. State agricultural colleges and experimental farms are therefore disseminating instruction and information in all directions. Yet such a development can only be gradual, and all influences towards increase combined—quite apart from the encroachments of maize [70]—cannot enable wheat-production to keep pace with the rapidly increasing population; so that within a few years the United States must become a wheat importer.

571. The natural increase of population, aided by continued immigration at an average rate approaching 1,000,000 annually, provides an ever-growing market [Fig. 96] for the great home **industries**, the expansion of which is strikingly illustrated by the fact that while in 1890 manufactures formed but 21 per cent. of the total exports, the percentage had risen to 35 in 1900 and 45 in 1910, that of manufactured imports having at the same time slightly declined. Agriculture and industry thus alike continue to offer to the immigrant attractions in many cases superior to those offered by any other region in the world. The opening of the **Panama Canal**, already referred to [534], will enormously increase the great coastwise commerce, which—by law—may be handled only by American vessels; and it will greatly assist the development of western states, whose traffic will be economically conducted through Pacific ports—particularly San Francisco. "**Reciprocity**" with Canada has been treated of [535].

ALASKA

Area, about 590,800 square miles ($=4\frac{7}{8}$ times Britain); population, 1910, 64,366.

572. Alaska, purchased by the United States from Russia in 1867, is mostly tundra; but the Yukon valley—except in the lower (seaward) region—and much of the southern shore are forested, birch and pine predominating, although hemlock-spruce and red and yellow cedar are also found on the coast. The long days of the short summer should favour agriculture over large areas (*cf.* Sakhalin), and agricultural experimental stations have been established. The wealth in fish and minerals is great. The fisheries (salmon, halibut, herring, cod, whales and seal from the Pribiloff Islands) yield one-fourth as large a harvest as those of the entire United States [548], and support the world's largest salmon-canning industry. Yukon valley mines yield one-sixth as much gold as all the United States combined, and considerable copper. The Yukon takes large steamers for a few months in summer, but the railway from Skagway to the upper Yukon is the best route to the mines. Most of the small trade is with Puget Sound ports.

MEXICO

Area, 767,005 square miles ($=6\frac{1}{3}$ times Britain); population, 1910, 15,063,207 ($=\frac{1}{3}$ Britain).

573. Mexico is mainly a triangular plateau, rising gradually and narrowing towards the southern apex above the low Isthmus of Tehuantepec. Raised edges descend on both sides to narrow, hot and unhealthy, but extremely fertile coastal plains, growing henequen,¹

¹ A coarse fibre, also called "sisal hemp," cheaper and stronger than jute, derived from the leaves of a species of agave.

rubber, cotton, sugar-cane, cacao and vanilla. The mountain edges, with lower seaward slopes densely covered with tropical forests rich in valuable timbers and dye-woods succeeded on the upper slopes by coffee and banana plantations, keep most of the interior so dry that irrigation is nearly everywhere necessary for agriculture, and—by excluding the oceanic influence—make the climate continental. **Political unrest** still withholds capital necessary to the development of irrigation, and agriculture itself is still most primitive. The chief crops are maize and beans (both forming a staple food), chick-peas and—where the height counteracts the heat—wheat and barley; and tobacco and maguey¹ are also important. Pasture is naturally extensive, and vast numbers of cattle, sheep and goats are reared; horses, asses and mules are bred, and maize feeds many swine. Atlantic fisheries are capable of great development; pearl-fishing is important in the Gulf of California.

574. The great **mineral wealth**, still comparatively untouched, at present constitutes the country's main economic importance; and silver is the outstanding product [Fig. 37]. There is a literal chain of silver-mines from the southern apex to the United States frontier, which have yielded for centuries and still yield enormous quantities of ore, those of Guanajuato, San Luis Potosi and Zacatecas being the richest. The value of the gold output is rather more than half that of silver, and it is obtained mainly on the Pacific slopes, particularly in Californian Gulf river-basins. The two precious metals jointly account for about two-thirds of the total mineral output, the balance being mainly copper, lead and zinc, with some very fine iron

¹ A variety of agave yielding a sweet juice from which the national drink—"pulque"—is made.

and inferior coal. The western Sierra Madre abounds in rich iron, especially behind Durango. Other minerals include antimony, tin, mercury, graphite, asphalt, salt, sulphur (from the crater of Popocatepetl), marble and precious stones (notably onyx and opal), while petroleum is obtained on the east coast round Tuxpan.

575. **Industries** are largely undeveloped. Textile mills, however, now consume the entire home output of cotton and wool, while hides from the pastures and bark from the forests support leather and saddlery works. Iron and copper support metallic industries, potteries use suitable clays, distilling and brewing flourish near grain-lands, paper is made from textile "waste" and pulp-wood from the almost deforested interior highlands, sugar is refined, tobacco and cigars manufactured, and chocolate, glass and soap made. The **railway system** is fairly extensive [Fig. 99]. The chief centres are **Mexico** (470,659), the capital and chief industrial city; **Puebla** (101,214); **Monterey** (81,006); **San Luis Potosi** (82,946); **Aguascalientes** (44,800) and **Celaya** (25,565). Important hill termini are **Guadalajara** (118,799), the second city; **Durango** (34,085), with a literal mountain of rich iron ore; **Chilpancingo** and **Oaxaca** (37,469). **Leon** (63,263), **Merida** (61,999) and **Zacatecas** (25,905) are also important industrial cities.

576. It is unfortunate that the steep western slope should provide the best harbours on that coast, remote from the great commercial highways and exceedingly difficult of access from the plateau. Trading convenience has thus forced the growth of ports on the low, sandy and unhealthy east coast, where poor harbours require costly attention. **Vera Cruz** (29,164), with a steep railway ascent¹ to the chief inland industrial

¹ The line climbs 8,000 feet in 8c miles.

centres and abundant water-power for its cotton-mills, is the chief port ; but it is being overtaken by **Tampico**, which commands easier routes to the rich San Luis Potosi and Monterey mineral regions. Carmen and Campeachy (or Campeche) export tropical timbers, and Progreso—the port of Merida—and Sisal,¹ henequen.

577. On the west coast Acapulco, with one of the finest natural harbours in the world, is little more than a coaling-station through lack of communication inland. At Manzanillo a wider coastal plain grows sugar, cotton and coffee ; and, like San Blas, it should benefit when contemplated railway connections with the interior are effected. The exposed harbour of Mazatlan commands the entrance to the Gulf of California ; La Paz exports local fruit ; and Guaymas, with a good harbour and direct railway connection with the United States system [Fig. 99], has a growing trade. Coatzacoalcos and Salina Cruz, at the northern and southern ends respectively of the railway across the Isthmus of Tehuantepec, possess a special importance and interest from the competition likely to arise between this cheap line and the expensive Panama Canal.

578. **Foreign Trade.**—Of the **exports** about 45 per cent. in value consists of gold and silver, the latter alone accounting for almost 30 per cent. Other important items are copper, henequen, rubber, hides and skins, and coffee. Of the **imports** 12 per cent. is machinery, and over 10 per cent. textiles, the chief other lines being chemical products, grain (mainly maize), iron and steel goods, coal and coke, wood, oils, paper, vehicles, railway rolling-stock, metal wares, lard, wine, boots and shoes. Two-thirds of the entire trade is with the United States, and 12 per cent. with Britain.

¹ Whence "sisal" hemp.

CENTRAL AMERICA

579. This region, comprising six small republics¹ and the colony of British Honduras,² consists mainly, like Mexico, of a plateau whose raised edges descend steeply to a narrow Pacific coastal plain and more gradually to a wide, low-lying and unhealthy Atlantic plain, where the excessive heat and moisture promote an almost impenetrable forest-growth rich in rubber³ and valuable timbers. The want of harbours on the sandy Atlantic coast, the difficulty of penetration inland from both coasts and intermittent political unrest have combined to retard the development of a region naturally rich in vegetation and minerals; and the population—nowhere dense—is mainly concentrated on the cooler and drier plateau areas. The line of least resistance between the plateau and the outer world leads meantime westward to nearer and better Pacific ports despite the steepness of the descent; so that Honduras, with a wide Atlantic frontage and a short Pacific coast, shows the least development and the lowest density of population, while Salvador, confined to the plateau and the Pacific coast, shows exactly the reverse.

580. The soil is rich and volcanic.⁴ Occasional Atlantic "clearings" grow heavy crops of bananas and

¹ Guatemala; area, about 48,290 square miles; population, 1910, about 2,000,000. Honduras; area, about 46,250 square miles; population, 1910, 553,446. Salvador; area, about 7,225 square miles; population, 1912, 1,161,426. Nicaragua; area, about 49,200 square miles; population, 1910, about 600,000. Costa Rica; area, about 23,000 square miles; population, 1911, 388,266. Panama; area, 32,380 square miles; population, 1912, 364,118.

² Area, 8,598 square miles; population, 1911, 40,458.

³ Plants were ruthlessly destroyed instead of tapped, till their threatened extinction led to restrictive laws and plantation.

⁴ The region is also subject to periodical earthquakes.

sugar-cane ; on the narrower and somewhat less moist Pacific plain there is more cultivation, sugar, rice, cotton, indigo, tobacco, cacao, rubber and many fruits being grown ; while on the cooler and drier plateau “temperate” crops prevail, including maize and beans—the staple food, as in Mexico ; and sheep and cattle yield wool, milk, meat, hides and skins. The outstanding product, however, is excellent coffee, which is increasingly grown on the upper seaward slopes and forms the bulk of the exports—mainly to the United States and Britain. Guatemala produces the most and Costa Rica the best. The few industries, mainly domestic, produce earthenware, useful wood and straw articles (especially hats), tobacco, leather, cottons and woollens. The chief **exports** are coffee, bananas and other fruits, hides, rubber, mahogany, cedar, logwood, cattle, tobacco, indigo,¹ cacao, coconuts, sugar, and some silver, gold and tortoiseshell. “Balsam of Peru”² is a special product from Salvador. The chief **imports** are cottons, hardware, and flour. Most of the trade is with the United States and Britain.

581. Four distinct inter-oceanic **railways** cross the region ; (a) in Guatemala, *via* Guatemala (90,000), the capital ;³ (b) in Honduras ; (c) in Costa Rica, *via* San José (31,668), the capital ; and (d) across the Isthmus of Panama by the Culebra depression, through which the Canal runs, from Colon or Aspinwall (17,748), on the Atlantic, to Panama (37,505). Belize (10,478), in British Honduras, is the best Atlantic port, with a

¹ Production has declined in competition with chemical dye (*cf.* India). ² A medicinal product originally sent to Peru for shipment to Europe—whence the name.

³ Now being connected with the Mexican system and so furnishing a link in the Pan-American railway which will one day connect New York with Buenos Ayres.

large export of the finest mahogany limited only by the floating capacity of the rivers. The "Canal Zone," a strip of land five miles wide on each side of the Canal, was ceded by Panama to the United States in 1903.

THE WEST INDIES

582. The West Indies, right in the track of the Trades, receive rain at all seasons; but the heavy summer evaporation gives them a "wet" season (from May to December) as opposed to a "dry" winter season. During the former, especially from July to October, violent hurricanes often cause great damage. Abundance of fresh sea air keeps the climate, though tropical, healthy, particularly in more exposed islands. With the exception of the sand-covered coral Bahamas, the islands are mountainous and volcanic,¹ the coastal plains being deeply covered with rich, volcanic soil. The east-and-west mountains in the larger islands make northern slopes and plains extremely wet, and southern drier, because sheltered; southern slopes thus grow coffee and tobacco to perfection, sugar-cane being everywhere a typical lowland crop. Dense mountain forests yield mahogany, rosewood, cedar and logwood.

583. **Cuba,**² the largest island, is a republic under United States' protection. Sugar is the main crop, the normal export being 50 per cent. above that of Java, the second exporter [Fig. 13]; and the success of Cuba, when most other islands find production difficult or altogether impossible, is due entirely to excellence of machinery and methods. Tobacco follows sugar closely in importance, the finest leaf growing on southern

¹ Many suffer seriously at times from fresh volcanic outbursts.

² Area, 44,164 square miles ($=\frac{1}{3}$ Britain); population, 1910, 2,220,278 ($=\frac{1}{16}$ Britain).

slopes in the west, whence the special association of Havana with the product. The eastern mountains provide shelter for extensive coffee plantations, but cultivation is declining in competition with Brazil and other sources. Cacao, bananas, pineapples and coconuts are other eastern products. Cattle graze on the uplands, and mountain forests yield the finest mahogany, cedar (for cigar-boxes) and logwood.

584. Manganese, copper and very fine iron are mined in the eastern mountains, the last being sent to the United States from Daiquiri. Roads are bad, but a **railway** runs from Santiago (53,614), which exports coffee and timber largely, to Pinar del Rio in the tobacco region, with connections north and south to all main ports. **Havana** (319,884), the largest West Indian city, handles most of the trade; Manzanillo exports timber. The trade is mainly with the United States, whence the island obtains its main foodstuffs; salted cod comes from Canada, textiles and coal from the United States and Britain, and hardware, kerosene and lumber mainly from the States.

585. **Haiti** is shared between two independent republics. The western French-speaking republic¹ of that name grows exceptionally fine coffee, the export (France taking two-thirds) occasionally following those of Brazil and Java in volume. Production might be much increased, but is restricted by a heavy export duty. Cacao and cotton are increasingly grown for export, and tobacco plantations are extending; sugar is grown and refined and rum distilled. The mahogany, like the Cuban, is very fine, and—with cedar and logwood—is largely exported. The chief imports are foodstuffs, cottons and kerosene, mainly from the

¹ Area, about 10,200 square miles ($=\frac{1}{12}$ Britain); population, 1909, about 2,000,000 ($=\frac{1}{12}$ Britain).

United States. Mineral wealth is great but undeveloped. Port au Prince (100,000), the capital and chief port, almost monopolises the foreign trade. Cape Haitien (30,000) and Aux Cayes (12,000) are other good ports. Inland communications are poor. The eastern Spanish-speaking republic of **San Domingo**¹ grows mainly sugar, tobacco and cacao; all are exported, with timbers, logwood and divi-divi.² Most of the exports go to the United States, whence more than half the imports—mainly foodstuffs, cottons, iron and steel wares, machinery, agricultural implements and kerosene—are obtained. Santo Domingo (22,000), the capital, does less trade than the northern port of Puerto Plata (16,000), which connects by rail with Santiago (20,000), the chief inland productive centre.

586. **Puerto Rico**,³ exceptionally fertile and healthy, is the most densely-peopled island. "Sea Island" cotton is an important crop; but sugar forms almost two-thirds of the exports, growing everywhere except on the southern plain, which is too dry until irrigation, now being provided, is available. Tobacco, coffee and fruits are important upland crops for export, and maize is largely grown. Cattle graze on the hills, but meat-production has to be supplemented by imports. Forests yield cabinet and dye-woods, and coconuts grow on the coast. The island appears to be rich in undeveloped minerals; salt alone is produced. Rum, cigars, straw hats and embroidered goods are the chief industrial products. A good road crosses the island from San Juan to Ponce; and a **railway**, already partly laid, will

¹ Area, about 19,325 square miles ($=\frac{1}{3}$ Britain); population, 1911, about 700,000 (= Manchester).

² A shrub whose pods are used for tanning and dyeing.

³ Frequently called Porto Rico. Area, 3,606 square miles ($=\frac{1}{8}$ Ireland); population, 1910, 1,118,012 ($=\frac{1}{4}$ Ireland).

encircle the island. Seven-eighths of the entire trade is with the United States.

587. **British West Indies.**—**Jamaica**,¹ with which are associated the Turks, the Caicos and numerous smaller islands, forms the largest British possession in the West Indies. Jamaica itself exports mainly fruits (especially bananas),² sugar, rum, logwood, coffee, cacao and spices (especially ginger). Behind Kingston (57,379), on the sheltered southern slopes of the forested Blue Mountains, very fine coffee is grown. The imports are mainly textiles and wearing apparel, breadstuffs, fish, wood, dairy products, boots and shoes, and meats; and more than half the total trade is with the United States. The smaller islands yield guano, phosphates, turtles, salt and sponges. The **Bahamas**,³ unlike the rest of the West Indies, are far from fertile [582]; but henequen and sub-tropical fruits, which a sandy soil favours, are increasingly grown. Turtles, pearls, guano and salt are typical products of the smaller islands. Pineapple-canning, henequen-weaving and the making of tortoise-shell goods are practically the only industries. The delightful climate makes Nassau, the capital, a popular health resort. Most of the trade is with the United States.

588. **Trinidad**⁴ produces chiefly cacao [94], which forms about one-third of the exports; but sugar is also important, and coconuts, coffee and tobacco are grown. Oil is successfully exploited in the south, and asphalt from the celebrated Brea ("pitch") Lake is a valuable export. The Gulf of Paria provides shelter for the

¹ Area (including dependencies), 4,424 square miles ($=\frac{1}{7}$ Scotland); population, 1911, 831,383 (white proportion, 15,605).

² Which form half of the exports.

³ Area, 4,403 square miles ($=\frac{1}{7}$ Scotland); population, 1911, 55,944.

⁴ Area, 1,870 square miles; population, 1911, 330,074 (including Tobago).

roadstead of Port of Spain (60,000), the capital and chief port. **Barbados**,¹ though but one-twenty-fifth as large as Jamaica, produces as much sugar as that island; and refining and rum-distilling are important. Cotton is also increasingly valuable. Bridgetown (16,648), the capital, an open roadstead on the south, has a considerable fishing industry. Of the Windward Islands, **St. Vincent** and **St. Lucia** both yield sugar, rum, cotton and cacao, and the forests of the latter also logwood. **Grenada** produces cacao, cotton, nutmegs and other spices. Of the Leeward Islands, **Antigua** produces sugar, cotton and pine-apples; the **Virgin Islands** and **Montserrat** sugar, cotton and lime-juice; and **Dominica** sugar, cotton, fruits (including limes), coffee, cacao, and cabinet and dye woods from her rich forests. **St. Christopher** (St. Kitts) and **Nevis** produce mainly sugar, cotton and rum. The excellent central harbour of barren **St. Thomas** (a Danish possession) makes it an important cable station and port of call.

589. **French West Indies.**—The rich forests of **Guadeloupe** are little worked, but dye-woods are exported. Pointe-à-Pitre (22,664), the chief port, has a splendid harbour. The chief commercial town in **Martinique** is Fort-de-France (27,019). Both islands produce sugar, rum, coffee, cacao, tobacco and cotton.

590. The **Bermudas**, about half-way in a direct line between the Virgin Islands and Nova Scotia, are an important British naval station. They are a small coral group whose sandy soil yields little but onions, potatoes and lily-bulbs, practically all going to the United States as "early" products. The islands are much in favour with Americans as a winter resort.

¹ Area, 166 square miles; population, 1911, 171,982.

QUESTIONS

85. Compare and contrast Canada with Siberia as regards advantages favouring production and commerce.

86. Explain carefully how the Great Lakes may be regarded as a rain-promoting influence.

87. Ascertain approximately from Figs. 91 and 92 the distance by rail from (a) Montreal to New York; (b) Montreal to Chicago; (c) Montreal to Winnipeg; (d) Winnipeg to Regina; (e) Regina to Vancouver; (f) Winnipeg to Prince Rupert. Compare your results with the distance from London to Edinburgh.

88. Explain the cause of Newfoundland fogs. Where else do similar causes produce similar results?

89. Labrador is in the same latitude as Britain. Why should the former be tundra while the latter is a productive, temperate land?

90. Estimate briefly the effect of the opening of the Panama Canal upon commerce and development (a) in Canada, (b) in the United States.

91. Mark on your atlas the chief coal-fields of Canada.

92. Say what you know of the following, explaining how their importance is the outcome of special advantages of situation: Montreal, Ottawa, Winnipeg, New York, Chicago, Minneapolis, St. Louis, San Francisco.

93. Discuss shortly "Traffic on the Great Lakes."

94. How would you justify the description of the United States as "self-sufficing"?

95. Write short notes on (a) petroleum-production in the United States; (b) the transport of Canada's harvest; (c) the United States as a wheat-source; (d) harbours and communications as influencing production in Mexico and Central America.

96. What fraction of (a) the total area and (b) the total population of Canada is contained jointly by Ontario and Quebec? [§ 523, footnote 3].

CHAPTER IX

SOUTH AMERICA



FIG. 103.—SOUTH AMERICA : RELIEF.
(After the Diagram Co.)

591. NORTH and South America are broadly similar in configuration [Fig. 103]. Both have western and eastern highland belts, the former prolonged, bold and

lofty, the latter broken, lower and less extensive; both have an east-and-west elevation across the interior,

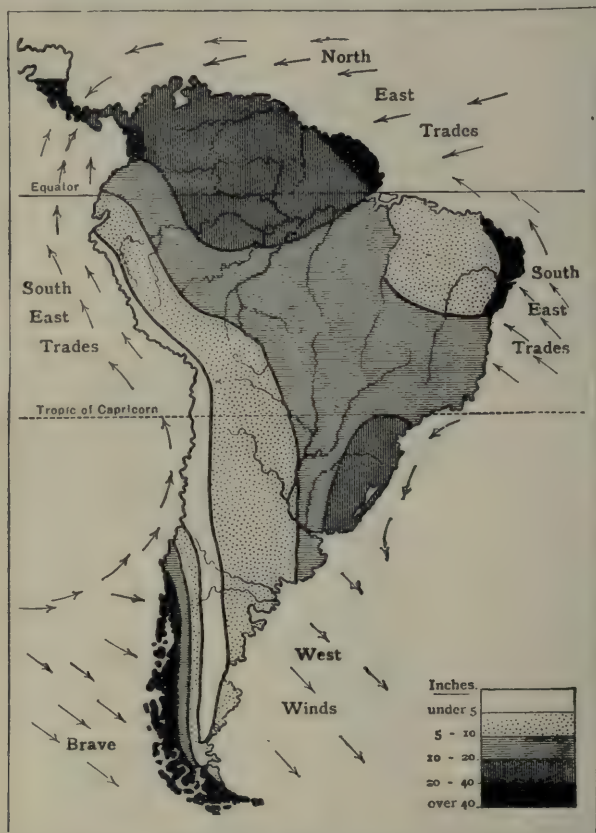


FIG. 104.—SOUTH AMERICA : MEAN WINTER RAINFALL—*i.e.*, JUNE, JULY, AUGUST.

from which the land slopes gently north and south; the Amazon corresponds to the St. Lawrence, and the Paraguay-Paraná to the Missouri-Mississippi. But there

are equally notable points of dissimilarity. The warmest part of North America is the narrowest, reaching only

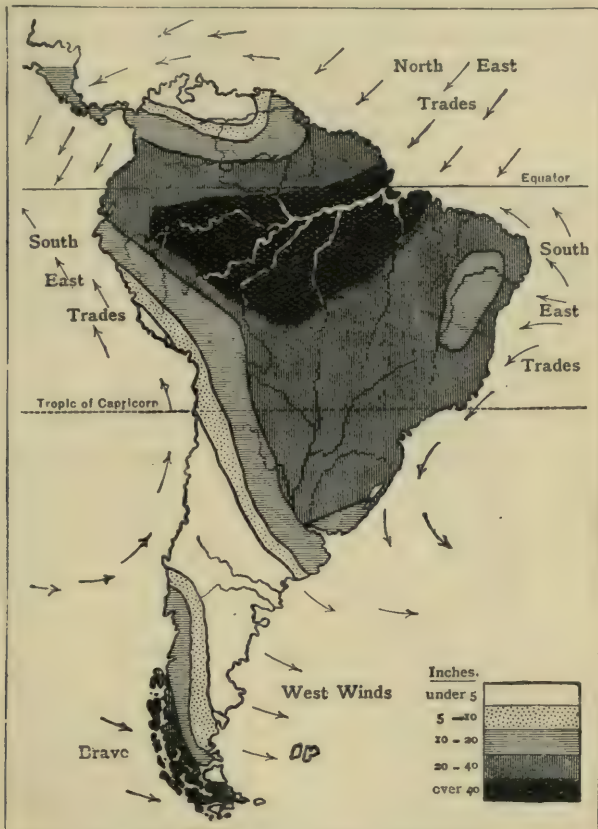


FIG. 105.—SOUTH AMERICA: MEAN SUMMER RAINFALL—*i.e.*, DECEMBER, JANUARY, FEBRUARY.

to within 10° of the equator; the hottest part of South America is the widest, and is crossed by the equator; and there is no tundra in South America, the most

southerly point being little farther from the equator than Winnipeg, though much cooler through elevation and the influence of an Antarctic current [594].

592. **Climate ; Winds and Rainfall.**—The Trades theoretically meet at the equator, *i.e.*, at the Amazon mouth ; and the combined winds carry an enormous

volume of water-vapour up the valley which, with the natural heavy equatorial rains [459], renders it exceedingly wet over a larger area than any other region in the world, no other river carrying so much water to the ocean as the Amazon. The area of heaviest rainfall fluctuates with the changing of the seasons [Figs. 104 and 105], but always includes the Amazon valley.

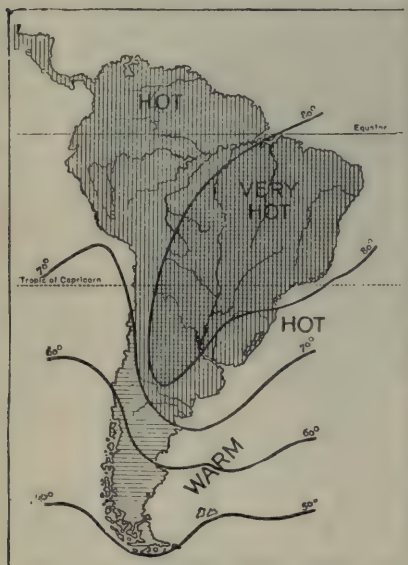


FIG. 106.—SOUTH AMERICA : MEAN ISOTHERMS FOR JANUARY.

593. From the eastmost bend of the continent to the Plate estuary the eastern highlands always secure a good rainfall from the south-east Trades, which convey little moisture to the interior, except south of the tropic ; in summer the heated interior [Fig. 106] draws them inland and the rains extend—though in steadily-diminishing volume—almost to the Andes foothills

(*cf.* § 514); but in winter [Fig. 107] they do not penetrate beyond the Paraguay. From the Plate valley to the Strait of Magellan the Anti-Trades, having deposited their moisture on the western Andean slopes, leave both interior and coast dry at all seasons. The S.E. Trades blow away from or parallel to the west coast, which is thus more or less arid from about the 33rd parallel to the equator (*cf.* § 514); while north of that line the coast shares in the moist-heat characteristic of Central American lowlands. The Anti-Trades always bring heavy rains from about the 40th parallel southward, but only in winter to the region between the 33rd and 40th parallels, where the climate is thus distinctly "Mediterranean."

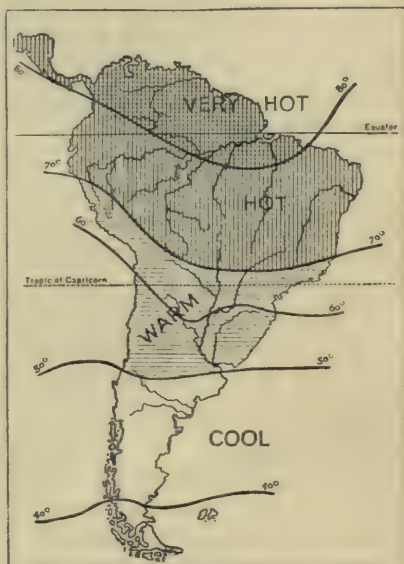


FIG. 107.—SOUTH AMERICA: MEAN ISOTHERMS FOR JULY.

594. **Temperature.**—With about four-fifths of its area within the tropics, South America lacks the African advantage of elevation, quite half the tropical land being lowland, and too hot and moist for "white" settlement. Of the comparatively small southern area outside of the tropics, on the other hand, not quite one-

third is lowland, the elevation accentuating the coolness, which is increased on the west by a cold north-flowing current and modified on the east by a south-flowing warm current (*cf.* South Africa).

595. But the continent has the advantage over Africa in the accessibility of the interior from the Atlantic. Ocean steamers ascend the Amazon for 2,500 miles to its junction with the Ucayali, and smaller steamers to the Andes foothills; while the river with its many great tributaries offers in all 25,000 miles of navigation.¹ Steamers ascend the Orinoco and the Paraná for almost 1,000 miles, and the Paraguay for 1,400; and many other rivers are more or less navigable for hundreds of miles. Owing to the aridity of most of the west coast and the steepness of the descent, western rivers are few and of little value except for irrigation and "power."

596. **Natural Vegetation.**—The vast tropical lowland area drained by the Amazon is practically covered by a dense forest-growth—"selvas" [Fig. 108]—whose outstanding product is rubber. Valuable timbers have been practically ignored, mainly through the importance and superior profits of rubber-gathering. Upland "campos" between these selvas and the eastern highlands are, because of the dryness, mainly savanna [462]. The low-lying upper Paraguay and Paraná valleys bear rich tropical forests merging westward into cultivated uplands and southward into warm, rich pastures in the lower Paraná valley. South and west of the Plate estuary lie the "pampas," or dry grass-lands (*cf.* the "prairie" of North America), furnishing natural pasture and growing excellent grain; and these in turn merge southward through semi-desert into the dry, cold, shingle-covered waste of Patagonia.

¹ Various estimated up to 50,000 miles, allowing for interruptions.

597. The tropical coasts from southern Brazil and the Gulf of Guayaquil northward are everywhere low, hot and moist with a dense tropical vegetation, often

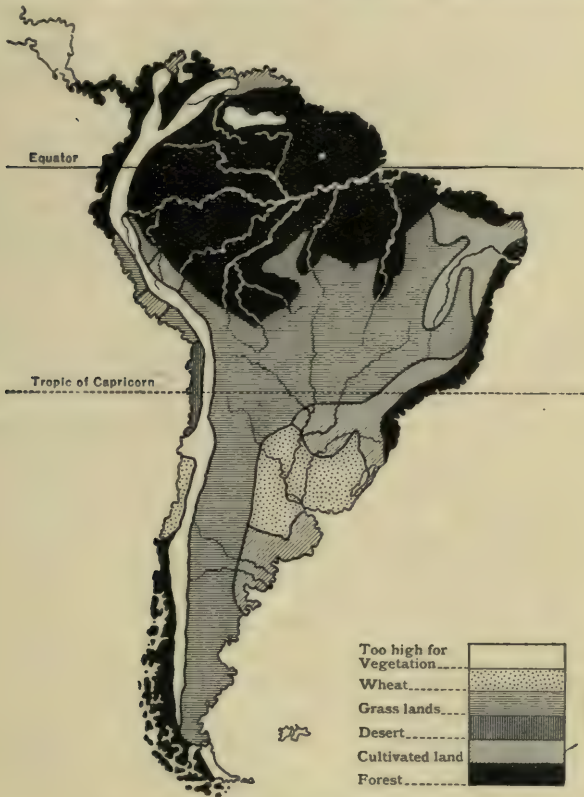


FIG. 108.—SOUTH AMERICA: VEGETATION.

fringed—especially between the Orinoco and the Amazon—with mangrove swamps. Clearings grow sugarcane and cacao, coffee being prominent on the uplands. From the Gulf of Guayaquil southward the rainless

west coast is barren, northern Chile containing the famous Atacama desert nitrate-grounds. South of the "Mediterranean" region [593] heavy rains clothe the seaward slopes with rich temperate forests similar to those of British Columbia. The entire length of the Pacific coast is backed by the lofty, volcanic Andes, and subject to intermittent earthquakes.

598. The slow development of South America is chiefly due to prolonged political unrest and the consequent "shyness" of capital; but most states now realise that prosperity lies in the steady, peaceful development of rich natural resources. Argentina and Chile have made rapid progress for many years, and latterly Brazil has pursued a liberal policy of development. This awakening is forcibly reflected in the exceptional growth of external commerce, of which two features call for special mention. The first is the predominant share falling to the United Kingdom and the United States. This is due on the one hand to enormous British capital investments—particularly in Argentina—and the excellence of British manufactures, and on the other hand to the proximity of United States markets and the cheapness and serviceability of American manufactures. The second feature is the increasingly important part played by Germany, whose enterprise and adaptability have secured either second or third place in the commerce of nearly every state.

COLOMBIA

Area, estimated, 461,606 square miles ($=3\frac{5}{8}$ times Britain); population, 1912, 5,475,961 ($=\frac{1}{8}$ Britain).

599. Development is retarded by the natural difficulty of the country, across which the Andes spread northward in three distinct branches, the pack-mule still largely monopolising transport. The tropical lati-

tude with variations in altitude favours an infinite variety of production ; and great mineral wealth should mean a bright future when capital is forthcoming for railways and exploitation.

600. The hot, moist coastal plains and low-lying Rio Negro selvas grow cacao, cotton and vanilla ; and forests yield rubber, balsams and vegetable ivory,¹ valuable timbers and dye-woods not yet being commercially available. Banana-growing, which provides the second export,² is extending on the Caribbean coast, where sugar and rice are raised for home use ; and rubber is now cultivated. Upper Orinoco savannas feed many cattle providing meat and hides. On the mountain foothills and upper valley slopes coffee, tobacco and maize thrive, the first—mainly in the upper Cauca and Magdalena valleys—being excellent and furnishing much the most valuable export. On the lofty, fertile interior plateaux, perennial snow-fed streams irrigate wheat and maize fields, fruit orchards and tobacco plantations, amid which lie **Bogotá** (121,257), the capital, and **Medellin** (70,547), the second city, both deriving milk and meat from extensive pastures. At Pradera, north-east of the capital, coal, iron and limestone all occur, supporting small iron industries there and at the capital ; while Bogotá has also breweries, distilleries, tanneries, and boot and tobacco factories. Emerald-mines at Muzo, near the capital, supply almost the whole world's demand, and salt-mines yield a large revenue to the state. Gold and silver abound everywhere, the former furnishing five-sixths of the mineral exports ; and coal and petroleum are found. Pearls are obtained on the Caribbean coast.

601. The Magdalena is navigable for 600 miles to

¹ The nut of a palm.

² The export has recently multiplied more than twenty-fivefold.

Honda, whence a railway is being built up to Bogotá while a troublesome bar is surmounted by a railway from Barranquilla to **Sabanilla** (or Puerto Colombia), the chief port. A canal also connects the river with **Cartagena** (34,889), the second port.¹ **Santa Marta** is a good port serving the "banana" country. The Cauca and the Atrato are navigable for about 200 miles; while Cabugaro, near the eastern plateau edge, is reached from the Atlantic by the Orinoco and its tributary, the Meta. **Baranquilla** (48,907) is growing in importance owing to its situation. **Buenaventura**, an excellent Pacific port, exports most upper Cauca produce—now received by rail. Imports include flour, lard, and kerosene from the United States; cottons from that country and Britain; and rice from Germany. Most of the coffee shipped goes to America; tobacco is a growing export to Germany, and cotton to Britain and France. Half the total trade is shared equally by Britain and the States.

VENEZUELA

Area, about 394,000 square miles ($=3\frac{1}{2}$ times Britain); population, 1912, estimated, 2,743,841 ($=\frac{5}{8}$ Britain).

602. Venezuela is crossed from west to east by a continuation of the eastmost branch of the northern Andes [599], a spur running northward to the west of Lake Maracaibo; and most of the small population is found in sheltered valleys where elevation tempers the climate and admits of grain-growing. Low, hot and moist coastal lands, especially round Lake Maracaibo, grow coconuts, sugar, cacao and cotton; while coffee, the chief product, and tobacco thrive on the uplands. North of the Orinoco, the "llanos" (savannas) graze

¹ Whose harbour is in danger of being silted up by a current.

cattle, providing meat for home use and hides for export; while selvas south of the Orinoco yield cabinet-woods, drugs, tonka beans, rubber and vanilla.

603. Undeveloped mineral wealth is great, gold alone, from Yuruari and Ciudad Bolivar, contributing substantially to the exports. Between **Caracas** and **Valencia**, the two chief highland towns, copper is mined; also at Aroa, on the railway from **Barquise-meto** to its port **Tucacas**. The output of coal round **Barcelona** is supplemented by imports from Wales. Iron abounds, especially at Imataca, on the lower Orinoco; silver is mined; marble is quarried at **Puerto Cabello**, the port of Valencia; salt is important, and pearls come from coastal islands, notably Margarita. Rich petroleum deposits have recently been found.

604. **La Guaira**, the port of Caracas, with which it has railway connection, conducts almost half the foreign trade. **Maracaibo** and **La Ceiba** export coffee, but both are suffering from the gradual silting-up of the entrance to Lake Maracaibo. **Ciudad Bolivar**, accessible to sea-going vessels, is the chief Orinoco port, with an important leather industry and exports of hides and gold. Tariff-protected industries are still rudimentary, manufactures bulking largely in the imports. Almost half the total **exports** is coffee, other items being cacao, balata and rubber, hides and gold; **imports** are foodstuffs, kerosene, hardware and cottons from the United States, and general textiles and manufactures from Britain. One-third of the total trade is with the States; France, Germany and Britain follow.

THE GUIANAS

605. The three Guianas consist mainly of (a) a hot, moist and unhealthy alluvial coastal plain; (b) a

densely-forested upland belt, rich in cabinet timbers and balata; and, behind the forests, (c) savannas. Most of the region is still unexplored, penetration being hindered by forests and fall-obstructed rivers; and the small population is found growing tropical products on the coastal plains and valleys. Mineral wealth is probably great; but gold alone is material meantime, with the addition of some diamonds from the western British mountains.

606. In **British Guiana**¹ sugar is the main crop, forming about two-thirds of the exports; and the rich soil, in which Orinoco mud plays a large part, makes competition difficult for the Dutch and French sections. But lower prices, due to increasing beet-production in temperate lands, may cause a gradual substitution of rice, cacao, tobacco and coconuts for sugar, all being now grown. Georgetown (54,000), on the Demerara, is the capital, and has railway connection with New Amsterdam on the Berbice. Sugar-refining and rum-distilling are important at both places. The chief **exports**, after sugar, are gold, balata and rice; and the **imports** mainly textiles, foodstuffs, etc. One-third of the exports goes to Britain, whence half the imports comes.

607. Although sugar is grown and refined in **Dutch Guiana**,² the competition mentioned makes cacao the chief crop, followed by coffee from upland "clearings." Bananas, rice and maize are grown, and gold is exported. The trade is mainly with Holland. Paramaribo (35,346) and Batavia are the chief towns, the former being the capital. Little is grown in **French Guiana**³ beyond cacao, which, with phosphates from coastal islands,

¹ Area, 90,277 square miles ($=\frac{3}{4}$ Britain); population, 1911, 296,000.

² Area, 46,060 square miles ($=1\frac{1}{2}$ times Scotland); population, 1911, 86,233 ($=\frac{1}{2}$ Dundee). ³ Area, about 30,500 square miles ($=$ Scotland); population, 1911, 49,009 ($=\frac{3}{10}$ Dundee).

timber, some gold, a few hides and red pepper from unhealthy mud-flats round the capital, Cayenne (13,527)—still a convict station—practically completes the list of exports. The trade is mainly with France.

BRAZIL

Area, estimated, 3,290,564 square miles ($= 27\frac{1}{2}$ times Britain) ; population, 1911, estimated, 23,070,969 ($= \frac{1}{2}$ Britain).

608. Brazil, though almost as large as Europe, has but a comparatively small cultivable area. The country consists mainly of (a) the vast, swampy Amazon selvas, and (b) the great eastern plateau, mostly the reverse of fertile, the seaward edge making it dry savanna-land or "campos." The tropical coastal plains yield the usual sugar-cane and cacao, with the addition of bananas, cotton, rice and tobacco according to local conditions; while the uplands grow excellent coffee. In the southern states are the rich, "temperate" uplands—at present mainly devoted to cattle-rearing—on which European immigrants are rapidly settling¹ and growing wheat and other "European" crops. In the shelter of the seaward edge the vine is grown for wine.

609. **Coffee** is the outstanding product, satisfying three-fourths of the world's demand [88-90]. Its cultivation is mainly centred in the state of São Paulo, where rich deforested slopes and suitable climatic conditions combine to give the best results. Various ports from Victoria to Santos (35,000) share in the export, but the latter has the largest hinterland, São Paulo City being the chief collecting centre. Over-production, usually synonymous with low prices, threatened the planters with ruin some years ago; but

¹ The average annual immigration, in response to special inducements, is now about 150,000, or about half the Canadian rate.

the State, by raising a large special fund, bought up the surplus coffee and withheld it from the market, afterwards selling as opportunity offered.¹ Further plantation is now illegal. **Rubber** is the second product, supplying almost one-third of the world's demand [132-133]. The convergence of rivers at Manaos (50,000) has made that port the chief centre for collection and shipment to Pará² for export. The threatened exhaustion of forest-trees is compelling the cultivation of rubber, and proximity to the sea is making Santarem and Obidos the chief centres.

610. **Cacao** is most largely grown on the coast round Caravellas and exported thence. Brazil's prominence as a producer has already been shown [94]. **Sugar** is said to be reviving, and is specially important round Pernambuco (150,000), where the soil appears to be inexhaustibly rich: refineries are important both there and at Bahia (290,000). Most **cotton** is grown behind Ceará (33,000) and Parahiba (32,000) and consumed in the mills of the country, yet the export is considerable [Fig. 19]. **Bananas**, a special northern product, are exported from Maranhão and Camocim along with sugar. The best **tobacco** is grown in the São Francisco and upper Tocantins valleys and round Bahia, which manufactures and exports it. Manioc and beans are most important in the former valley, and, with rice from the coast, form the staple food. Bahia and Aracaju both export costly timbers from their hinterland. Valuable Amazon timbers are not yet much drawn upon [596], but lumbering is spreading in the temperate pine forests of the southern seaward slopes. Brazil-nuts come mainly from the Rio Negro valley.

¹ The whole operation has been termed the "valorisation" of coffee.

² Whence the designation of the finest rubber as "Pará."

611. **Minerals** abound, especially in Bahia and Minas Geraes, but only gold and diamonds—hardly equal to South African stones—are at present important, mainly in the latter state and at Cuyaba, on the upper Paraguay, which has steamer communication with Buenos Ayres. Iron is plentiful, but useless meantime through difficulty of transport. There appears, unfortunately, to be little coal, and that inferior; but abundant water-power largely atones—*e.g.*, hydro-electric works furnish current for the industries, tramways and lighting of Rio de Janeiro, São Paulo and Pernambuco.

612. **Industries**, except at a few centres, are still quite rudimentary. Besides those mentioned, sugar is refined and rum distilled at Ceará, Maceio (33,000) and Campos; cottons are made at Rio de Janeiro and São Paulo; woollens at Rio, Nictheroy (35,000) and Campos, with their extensive inland pastures; and brewing, flour-milling, tanning, and the making of soap, candles and furniture are carried on. **Rio de Janeiro** (1,128,637), the capital and second South American city, beautifully situated on a large, deep and sheltered bay, is a great port and industrial centre. São Paulo State is the richest, growing two-thirds of the entire coffee-crop, as well as tobacco, rice, sugar-cane, beans, millet and other grains; and **São Paulo City** (450,000), the third in South America, almost monopolises cotton manufacture, and makes glass bottles (for the breweries and distilleries), boots, shoes and hats.

613. Most eastern ports have splendid harbours; but Rio Grande do Sul and Porto Alegre (100,000), both handling cattle from the campos, have a troublesome bar at the entrance to their lagoon. Extensive port-works have been carried out at Bahia and other ports, and at Manaus to assist the rubber trade, railway

construction and river improvements being promoted with the same object. All chief ports have railways



FIG. 109.—SOUTH AMERICA: COMMUNICATIONS AND TOWNS.

to their hinterlands, and an extensive system is already focussed at the two chief cities, communicating south-

ward with the Uruguayan system [Fig. 109]. An important line surmounts the Madeira rapids, but for which steamers could reach the foothills of the Bolivian Andes. The foreign trade [Fig. 110] has doubled within ten years.

URUGUAY

Area, 72,210 square miles ($=\frac{3}{4}$ Britain); population, 1911, 1,177,560 ($=\frac{1}{4}$ Britain).

614. As Uruguay is nowhere high, the rainfall is moderate, the latitude assisting the oceanic influence to make the climate mild. The rich, undulating grass-land is pre-eminently adapted for stock-raising; and there are more cattle and sheep in proportion to the population than in any other country. The great slaughtering industry, four-fifths of whose output is “jerked” beef¹ for export mainly to Brazil and the West Indies, is centred at Paysandu² (20,953) and Monte Video, where horn and leather industries are important. Fray Bentos makes meat extracts, and Durazno and Soriano are the chief sheep-rearing centres and wool-markets. Although the cultivated area is no larger than Norfolk, agriculture is making

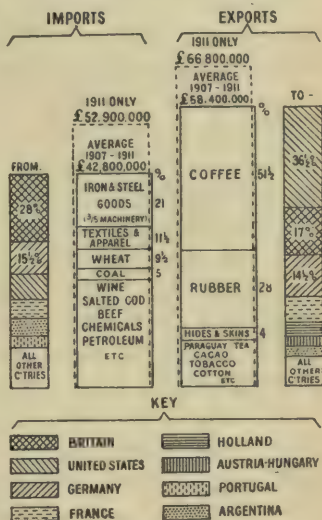


FIG. 110.—BRAZIL: FOREIGN TRADE.

¹ The meat is salted, pressed under stones to extract the juice, and sun-baked; after which it will keep for some time.

² Which may be reached up the Uruguay by 15-foot vessels.

rapid strides. Two-thirds of the fields grow wheat; flax (for seed) is the second crop, and oats the third. Barley is becoming important. In the north, behind the sheltering seaward rise, the vine is grown for wine, with tobacco and the olive. Mineral wealth is large in the north, but only gold and some lignite are worked.

615. **Monte Video** (352,487), the capital and chief port, whose shallow harbour necessitates the use of lighters in loading and unloading vessels, already commands important railways [Fig. 109]. **Salto** (19,788) may be reached by steamers up the Uruguay. The chief **exports** are wool, nearly 40 per cent. of the total; hides and skins, 25 per cent.; meat products and livestock, over 15 per cent.; wheat and flour; and linseed. The chief **imports** are textiles and apparel, $12\frac{1}{2}$ per cent.; iron and steel goods, $7\frac{1}{2}$ per cent.; coal, sugar, wood, wine and oils. Britain has 20 per cent. of the total trade, Germany, France, Argentina and Belgium following.

ARGENTINA

Area, 1,153,119 square miles ($=9\frac{1}{2}$ times Britain); population, 1911, 7,171,910 (= Greater London).

616. The most notable attributes of Argentina are (*a*) its great length from north to south, giving it every variety of climate from tropical to cool; and (*b*) its extreme flatness, facilitating transport and encouraging development. Unlike Brazil, more than one-third of the country is suitable for either stock-raising or agriculture. The northern region—"El Gran Chaco"¹—is largely a "thinning" of the Brazilian selvas, its valuable timber treasures being practically untouched except for supplying the furniture and carriage-building industries of the capital and a certain amount of

¹ The "great hunting-ground."

quebracho¹ for home use and export. The forests fade westward, allowing irrigation to support tropical and sub-tropical cultivation, sugar being the chief crop and giving rise to refineries and distilleries at Jujuy, Salta (40,000), Tucuman (78,695) and Catamarca. Tobacco, yerba maté [623] and maize are raised, cotton is promising, and at Salta and Jujuy even coffee is grown.

617. The Gran Chaco merges southward into the warm, rich grass-lands of the **pampas**, which support enormous numbers of cattle and sheep, and yield wheat, maize, flax and oats. It is now many years since agriculture overtook stock-raising in importance, and a net annual immigration of about 120,000 implies a continued rapid conversion of pastures into grain-fields. Four-fifths of the sheep pastures yielding Argentina her great wool-clip [116-119] lie on the pampas between Buenos Ayres and Bahia Blanca, the former being naturally the chief market. The cattle-lands are mainly north of Buenos Ayres, where the greater warmth and moisture produce richer grass; and the **maize** belt lies between Rosario and the 30th parallel. Buenos Ayres, between cattle and sheep lands, has the greatest meat and mutton-freezing plant in the world.

618. **Wheat** covers one-fourth of the cultivated area, the best lands being between the capital and the 30th parallel, from the Uruguay west to Cordoba. Entre Rios is the richest region. Argentina's position as a producer and exporter has already been discussed [64-67]. **Flax** (for seed), grown in the same belt, occupies one acre for every four devoted to wheat, and supports oil-mills at St. Elena, Santa Fé, Paraná (35,857), Cordoba (100,000), and Buenos Ayres. Argen-

¹ A hard wood much in demand for railway "sleepers" and yielding a useful tanning extract.

tina is one of the chief sources of linseed [112]. Much of the **southern pampas** will doubtless yet be made productive. Wheat is grown by Scotch and Welsh immigrants in the Chubut valley; the Rio Negro valley, served by a river navigable for 300 miles, is being settled and stocked with sheep and cattle; and western Patagonia is fertile, though dry. In northern Patagonia areas of inland drainage contain marshes yielding salt for making jerked beef [614].

619. The dry heat of the lower **Andean slopes** round Mendoza (60,000) and San Juan (15,262) produces, by irrigation, perfect fruits which are conveyed by special fast trains direct to the capital along with fruit similarly raised at San Luis (13,994); and vineyards enable French settlers to make excellent wine. Similar conditions with greater warmth at Rioja and Catamarca produce oranges, and favour raisin-curing. Butter and cheese factories are widespread in the cattle region, especially in Santa Fé; and rich lucerne grazing [176] enables similar industries to flourish round Mercedes. Distilleries consume maize at Rosario and Santa Fé. The Andean regions are probably rich in **minerals**, which are little exploited. Gold and copper are obtained near San Juan, Rioja and Catamarca, and silver at Catamarca, all three metals forming exports. Till recently the country was believed to possess no coal, but deposits have been located along with petroleum at Mendoza, Jujuy, and Comodoro Rivadavia on the Patagonian coast about 700 miles south of Buenos Ayres. The coal of Mendoza and the oil on the coast are being worked, and the economic effect of these discoveries will be interesting. Imported Welsh coal has hitherto been dear, industries being thereby penalised; yet outward freights for agricultural produce have been

cheap only because of coal importation, and agricultural exports cannot stand the heavy freights which its cessation would doubtless entail.

620. Besides industries mentioned, **Buenos Ayres** (1,383,663), the capital, one of the world's handsomest cities and the largest in South America, has important flour and leather industries, and breweries consuming a rapidly increasing barley-crop; while other branches produce rough cottons and woollens, sacks, sugar, hats and paper. The city, centrally situated on the Plate estuary at the edge of the level pampas, is the natural focus of a great railway system¹ which already includes the only trans-continental line *via* Mercedes, Mendoza and the Uspallata Pass² to Valparaiso [Fig. 109]. The Pan-American Railway will one day connect it with New York *via* Tupiza.

621. Railway - congestion at harvest and wool-clipping times is acute (*cf.* § 518), and a similar dock-congestion at Buenos Ayres, despite the magnificent accommodation, is only partly relieved by the outport of **La Plata** (99,766). The growing port of **Bahia Blanca** (72,706), however, may provide some relief

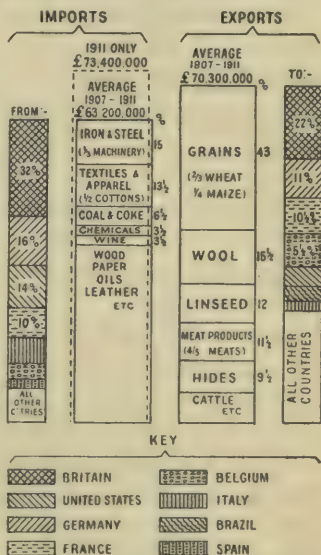


FIG. III.—ARGENTINA: FOREIGN TRADE.

¹ In which, unfortunately, three different gauges have been used.

² Almost 13,000 feet above sea-level.

besides offering an outlet for its rapidly-developing hinterland. **Port Argentine** on the Bay of Samborombon is being made a great naval port, and may also be fitted to handle some traffic. **Rosario** (180,000), the chief river port and a great railway centre, will soon be able to dock 21-foot vessels and develop its direct export trade. **Santa Fé** (48,600), another great river port and railway centre, is being given new and extensive docks to accommodate the enormous traffic. **Corrientes** (30,000), an important river junction, has ship-building and repairing docks and railway connection with both Buenos Ayres and Monte Video. The **foreign trade** [Fig. 111], two-thirds passing through Buenos Ayres, has grown 150 per cent. in ten years.

PARAGUAY

Area, about 171,770 square miles ($= 1\frac{5}{7}$ Britain); population, 1911, estimated, 700,000 (=Manchester).

622. Paraguay has an exceedingly rich soil and valuable timber reserves on the Gran Chaco. The chief need is railways to make products available. Encarnacion and Asuncion mark the limits of navigation for large steamers on the Paraná and Paraguay respectively, and the only railway connects both cities with the Uruguayan system [Fig. 109]. Produce for export must be conveyed to the rivers or the railway often for great distances, by bullock-cart, or, where tributaries exist, by small river craft; and the drying-up of these tributaries frequently stops transport and causes great loss. The only timber extensively cut is quebracho [616], and the floating of the logs depends again on the depth of water in the streams.

623. Cattle-rearing is the main occupation. Government-encouraged "saladeros" make jerked beef, espe-

cially at Asuncion, near which salt is found ; and hides support leather-works at that city. Other products are manioc and maize (the staple foods), cacao, coffee, ramie fibre,¹ tobacco, sugar, cotton and yerba maté.² Of these the last is the distinctive and most important product, largely exported to other South American countries. With improved transport and industrial development cotton should become important. The tobacco is excellent, and much in demand in Argentina and Germany for cigars. The southern area between the rivers is a perfect fruit and cattle land. Oranges are so plentiful as to be used even for hog-fattening, and so fine as to be in demand for export, despite their frequently damaged condition after long journeys in jolting bullock-carts.

624. Agriculture is still primitive, and transport conditions tend to confine it to lands near the main communications. The chief collecting-centres are thus on or near the Paraguay, *e.g.*, Concepcion (15,000), San Pedro (8,700), Rosario, Asuncion, Villeta and Pilar (10,000); or on or near the railway, *e.g.*, Paraguari (10,000) and Villa Rica (26,000). **Asuncion** (80,000), the capital and an important river junction, almost monopolises the industries, producing, besides commodities named, sugar, rum, cigars, furniture, soap, bricks and tiles. Having no coast-line, the country transacts its foreign trade through Argentina and Uruguay. **Exports** include yerba maté, hides, quebracho, tobacco and oranges; and **imports** cottons, wine and rice—about half coming from Britain.

¹ The fibre of a plant of the nettle family, very strong and capable of being made into a great variety of materials.

² Or "Paraguay tea." The leaves, infused, make a stimulating beverage. It is greatly valued in South America.

CHILE

Area, 292,580 square miles ($=2\frac{1}{2}$ times Britain); population, 1910, 3,415,060 ($=\frac{1}{4}$ Britain).

625. The enormous length of narrow Chile gives it a range of climates possessed by few other lands. From Coquimbo to the Peruvian frontier the climate is arid but healthy, and from Taltal northward the coast bears extensive guano deposits. Behind these is the great desert covered with **nitrates**, to which Chile largely owes her prosperity. Iquique (44,171), Antofagasta (32,496), Taltal and Mejillones lead in the export. The output, which has trebled in twenty years, satisfies practically the whole world's demand. The **northern mountains** are rich in minerals, copper and silver being meantime the chief. The former, richest near La Serena, is exported from Coquimbo, the latter being obtained mainly near Copiapo and exported from Caldera. Rich iron deposits have been located near Coquimbo, but the inferior coking qualities of Chilean coal render them unavailable. Railways from Bolivia bring to Antofagasta and Arica [Fig. 109] much of the foreign trade of that country; and the recent extension to Mejillones should benefit that port also. **La Serena** (24,425), on the verge of the "Mediterranean" region, grows flowers and fruits and produces honey and wax.

626. In the **central "Mediterranean" region** [593] the most productive and densely-populated area is a sheltered valley, half as large as Ireland, between the Andes and a coastal range through which a break gives access to the great port of Valparaiso.¹ Climate and products are similar to those of the valley of southern California, except that the cooling influence of the

¹ Cf. San Francisco, even to the earthquakes.

current washing the coast banishes oranges and lemons. Irrigation, nearly everywhere necessary, is obtained from mountain streams.¹ Wheat is important for export, barley supports breweries at Santiago and Valparaiso, and the vine supplies a great wine industry; tobacco, apples and walnuts are important, and wool and leather industries draw material from upland pastures above which forests yield timber for furniture and railway cars and wagons. The dry warmth favours raisin-curing (*cf.* § 619), and dairying is becoming important. Minerals abound in the central highlands. Rich copper is plentiful near Santiago, and gold near Lebu, where, as at Arauco and Concepcion, coal is abundant, if inferior. Coal is shipped to other Pacific states, mainly from Coronel and Lota; but three-fifths of the coal consumed is British and Australian.

627. **Valparaiso** (179,815), the main outlet for the valley described above, is the chief port and industrial centre, shipping one-third of the exports and receiving nearly all the imports. The harbour is now sheltered by a fine breakwater. Iron and steel and locomotive works are important. The first trans-continental railway reaches the city from Buenos Ayres *via* the Uspalata Pass, sending a branch south to Concepcion [Fig. 109] through **Santiago** (332,724), the capital and fourth South American city, also a great industrial centre. The line crosses a rich cattle country between **Talca** (38,040) and **Chillan** (42,500), furnishing **Constitution** with trade in hides and tallow. At **Concepcion** (55,554) leather and wine industries thrive; coal is exported through **Talcahuano** (16,261), which, with its outport Tome, is one of the best ports. **Valdivia**

¹ Further extensions of the system might multiply the cultivable area many times.

(17,681), with large breweries consuming local barley, exports lager beer, cattle, hides and lumber.

628. From Valdivia, southward, rich forests, due to the heavy rains, clothe the mountains, and the sunk coastal plain explains the broken coast-line, whose

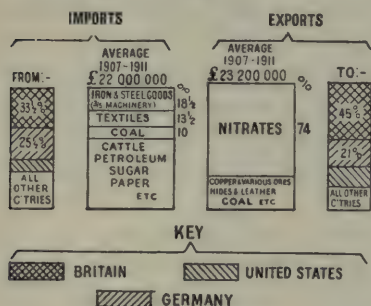


FIG. 112.—CHILE: FOREIGN TRADE.

many fiords are richly stocked with salmon and other fish (*cf.* § 522); lumbering and fishing are the chief occupations. **Puerto Montt** exports coal from the opposite island of Chiloë. At **Punta Arenas**, an important port of call on the Strait of Magellan,

with local coal and traces of petroleum, sheep-rearing is becoming important. The **Foreign Trade** [Fig. 112] has more than doubled within ten years.

PERU

Area, 695,733 square miles ($= 5\frac{3}{4}$ times Britain); population, 1896, estimated, 4,609,999 ($= \frac{1}{10}$ Britain).

629. The Peruvian coast, except in the north,¹ is arid, and yields guano and nitrates, the former, most plentiful on the Guanape Islands, being chiefly exported from Chimbote. Where snow-fed streams cross the desert, irrigation produces sugar-cane, rice and cotton in the tropical heat, and the cultivated area might be increased many times. Cheap irrigation makes sugar profitable even at low prices, Truxillo, Salaverry and Huanchaco leading in the export. Two-fifths of

¹ Where the moisture due to mists is heavy from midnight to dawn.

the total exports consists equally of sugar and cotton, the demand for the latter, owing to its peculiar suitability for mixing with wool, causing increased production. Irrigated coastal lands also grow oilseeds, tobacco (now a Government monopoly), and increasing quantities of cacao; and experiments are being made in silk-production. Farther inland, beside the streams, the vine is grown for wine, especially behind Pisco, along with the native maize.

630. The central mountain region is exceptionally rich in **minerals**. Silver and copper are the chief, notably at Cerro de Pasco and Puno. The former has developed greatly since the railway which climbs from Callao [Fig. 109] reached it; the latter commands navigation on Lake Titicaca, and is connected by rail with the Bolivian system and the port of Mollendo. Huaraz (7,646), another mineral centre, and the quicksilver mines of Huancavelica now both communicate with ports by rail. The largest coal-field so far discovered in South America extends along the coast from near Lima to behind Pisco; and a petroleum-field near northerly Payta furnishes fuel for industrial use. The treeless plateau round Lake Titicaca, too high for the ripening of grain, is the natural home of the llama, the alpaca and the vicuña, which provide very fine wool, and skins for morocco, as well as a means of transport. The plateau slopes downward towards **Cuzco** (15,000), where the fertile soil produces grain and the native potato and supports many cattle, leather-tanning and brewing being important.

631. The eastward Andean slopes—the “*Montaña*”—sink towards the upper Amazon selvas, where rubber, cinchona¹ and coca² are important, **Iquitos** (12,000),

¹ Whose bark, often called “Peruvian bark,” yields quinine [386].

² A plant whose leaves yield the powerful drug, cocaine.

which is reached by steamers from Britain, being the chief collecting centre. Extensive pastures yield hides, and the region, when opened up,¹ should grow excellent cotton, coffee and cacao. **Lima** (140,884), the capital, makes coarse cottons and woollens, boots, ice, and beer from Huancavelica barley; **Callao** (31,000), the chief port, makes soap, candles and matches; water-power drives textile mills at **Arequipa** (40,000), and Panama hats [636] are made in the north at Payta and Piura, where otherwise the less extremely dry climate might favour textile industries. Of the **exports** one-fourth consists of minerals—mainly silver and copper, one-fifth of sugar and one-fifth of cotton; others are rubber, wool and hair. **Imports** include textiles, iron and steel goods and machinery, grain and flour. Britain has 40 per cent. of the total trade, the United States, Germany and Chile following.

BOLIVIA

Area, 708,195 square miles ($=5\frac{5}{8}$ times Britain); population, 1910, estimated, 2,267,935 ($=\frac{1}{6}$ Britain).

632. Bolivia has no coast-line. **Minerals**² from the Cordilleran region form the main wealth, particularly from slopes edging the great plateau where Lake Titicaca is drained southward through Lake Poopo into vast marshes³ yielding salt for ore-reduction. Tin is the outstanding product, Bolivia producing one-fourth of the world's supply—notably at **Huanuni**, east of Lake Titicaca. Silver follows tin, the mines of **Huanchaca** being especially productive since their

¹ For most products this means when the region has railway connection with the west coast. Coffee and cacao could not stand the prolonged moist heat of transport down the Amazon.

² Bolivia is one of the richest mineral countries in the world.

³ The drainage and evaporation are causing Lake Titicaca to dry up.

connection with the Oruro¹-Antofagasta railway, whose high cost was entirely met by silver from this centre. The mines of **Potosi** (23,450) and **Colquechaca** are probably as rich, requiring only railway connection to stimulate production. Bismuth and copper follow, and borax is important at Ascotan. Petroleum has been located near Calacoto, on the Arica-La Paz railway.

633. The plateau is deeply seamed by river valleys,² the range of temperature according to the depth causing great variety of production from temperate grains and fruits to the sub-tropical coffee and pineapple. On the plateau the potato is important, and the saline soil provides excellent grazing for sheep, alpacas, llamas and vicuñas, whose wool is exported. The richest agricultural centres are **Cochabamba** (24,512), **Sucre** (23,416), and **Tarija** (7,817), where cattle, mules and pigs are also reared. The eastern highlands slope rapidly through ideal coffee, cotton and cacao lands to the great rubber reserves of the Beni selvas and the rich cattle lands of the Mamore and Pilcomayo Chaco, the latter being still undeveloped. Beni rubber is shipped to Pará by the aid of the railway surmounting the Madeira rapids. **La Paz** (78,856), the capital, admirably situated on the plateau above one of the rich valleys, is a great quinine and coca market, and commands three railway routes to the coast [Fig. 109]. Of the **exports** tin forms almost two-thirds, and rubber almost one-third; **imports** include textiles and clothing, provisions, hardware, wines and spirits. Most of the trade, which passes mainly through Chilean and Peruvian ports, is held by Britain, Germany and the United States following.

¹ Population, 20,670.

² Whose extensive water-power might be utilized.

ECUADOR

Area, about 116,000 square miles (= Britain) ; population, 1910, estimated, 1,500,000 ($=\frac{1}{30}$ Britain).

634. The Andes cross Ecuador in a double chain containing some of the greatest volcanoes in the world, and enclosing the central plateau, temperate because elevated, dry because of sheltering ranges, and rich because covered with volcanic soil brought down by snow-fed streams from the heights. On this plateau are the two chief cities—**Quito** (70,000), the capital, and **Cuenca** (30,000)—surrounded by wheat, barley, potato and lucerne fields, the last supporting cattle for milk, meat and hides ; and on the slopes graze sheep, yielding mutton and wool. The eastern slope—or “*Montaña*”—merges, as in Peru, into the upper Amazon selvas, whence rubber and—at Zaruma—gold are obtained.

635. The semi-aridity of the northern Peruvian coast extends to that of Ecuador as far north as **Manta**, where the equatorial forest-belt begins and yields rubber, bamboo, vegetable ivory and cinchona. Conditions here are ideally favourable to cacao, of which Ecuador is one of the largest producers [94], her cacao being generally regarded as the finest in the world. Very fine coffee is grown on the seaward slopes. Tobacco is raised, the sugar-cane is important on the coast, and rubber cultivation is counteracting the approaching exhaustion of natural supplies (*cf.* Brazil). South of Manta irrigation is obtained for similar crops, which are greatly assisted by night mists.

636. Cotton has declined, merely sufficing to support some mills at **Guayaquil** (80,000), the chief port, which practically monopolises the few industries, producing

leather, woollens, flour and beer from raw material raised on the plateau, cutting timber, and making soap and Panama hats. These hats, so called because they first reached Europe *via* Panama, are a speciality of the country, although both northern Peru and Colombia are entering into competition. They are plaited of the very fine torquilla straw, the whole process being performed while the night mists last.

637. The country is rich in **minerals**, which, but for the gold of Zaruma, are practically untouched. Petroleum is worked at Santa Elena. No adjectives are too strong for the roads of Ecuador, by which almost entirely communications are conducted; but Quito is at last connected by rail with Guayaquil, and other lines are being laid. Two-thirds of the **exports** consists of cacao, most of which goes to France and Spain; and most of the balance is vegetable ivory and rubber. The chief **imports** are textiles and clothing, food-stuffs, and iron and steel goods, one-third of the total coming from Britain, almost as much from the United States and one-fifth from Germany.

SOUTH AMERICAN ISLANDS

638. Salt is the main product of the many small northern islands, especially Oruba, Buen Ayre and Curaçao, the last growing a bitter orange with which the liqueur named after the island is flavoured. The **Galapagos Islands**, 700 miles west of Guayaquil, belong to Ecuador and have rich sulphur deposits. The **Falkland Islands** are British; the climate is cold, damp and foggy; and the small population mainly rears sheep and cattle, frozen mutton and wool being growing exports. Whale-fishing also furnishes oil for export. **Stanley** (800), the capital, has facilities for

ship repairs; and the good harbour forms an excellent refuge for vessels rounding stormy Cape Horn.

QUESTIONS

97. Summarise the main aspects of configuration and climate in which North and South America are (a) similar, (b) dissimilar.

98. Account for the aridity of the north Chilean and Peruvian coasts.

99. Explain the causes of the twisting of the summer isotherms across Chile and Patagonia [Fig. 106].

100. Define a "Mediterranean" climate, explaining the contributory causes and enumerating the regions of the world in which the characteristic conditions prevail.

101. Why do Britain, the United States and Germany figure so prominently in the foreign trade of South American states?

102. Write short explanatory notes on the following: Montaña; El Gran Chaco; selvas; llanos; campos; pampas; quinine; yerba maté; cocaine; quebracho; jerked beef; Panama hats.

103. Describe the hindrances to development in (a) Paraguay; (b) Colombia.

104. Compare Valparaiso with San Francisco.

105. Write a short descriptive essay on "Production in Argentina."

106. Calculate the density of the population in the various South American states, and endeavour to account for the differences shown.

107. Say what you know of the following, explaining how their importance is the outcome of special advantages of situation: Valparaiso; Buenos Ayres; Santos; Bahia Blanca; Corrientes; Manaos; Iquitos.

108. Draw up a list of products of which South American countries are leading sources.

CHAPTER X

EUROPE

(For the Balkan Peninsula, Italy, Spain and Portugal, see Chapter III.)

639. EUROPE'S prominence in industry and commerce is due mainly to a combination of favouring influences—her temperate climate, free from extremes



FIG. 113.—EUROPE : WINDS AND RAIN, NOVEMBER TO APRIL.

of moisture or drought ; her great mineral wealth ; her central position amid the great land masses of the earth ; and the exceptional accessibility of every part from the sea—especially by natural waterways.



FIG. 114.—EUROPE: WINDS AND RAIN, MAY TO OCTOBER.



FIG. 115.—EUROPE: MEAN ISOTHERMS FOR JANUARY.

North and east of the central mountains the continent is mainly a vast lowland plain, continued eastward

over the low Urals into central Asia and bounded on the north by the Arctic Ocean.

640. **Climate.**—The Anti-Trades strike the continent at all seasons from northern Spain to the North Cape, conferring a substantial rainfall upon western lands [Figs. 113 and 114]; but only in summer are they



1=under 50° F.; 2=50° F. to 68° F.; 3=over 68° F.

FIG. 116.—EUROPE: MEAN ISOTHERMS FOR JULY.

drawn sufficiently far east by the heat of the land to carry a steadily-diminishing rainfall as far as eastern Russia. These winds, naturally warm, bring the warm Atlantic surface-water against the western shores [Fig. 3]; and wind and drift together moderate both summer heat and winter cold, the extreme temperatures gradually diverging towards the east [Figs. 115 and 116] where the Russian climate is distinctly

continental. The winter cold in the centre and east is accentuated by exposure to Arctic winds, whence the remarkable twist of the winter isotherms.

641. **Natural Vegetation.**—The tundra belt, wide in Asia, narrows in northern Europe and ceases altogether, under the Atlantic influence, before reaching the North Cape. The European forest-belt to the



FIG. 117.—EUROPE: NATURAL VEGETATION.

south is correspondingly wider [Fig. 117], originally covering most of the continent—including Britain; and it gradually fades in the increasing dryness into the steppes [323] of southern and south-eastern Russia, which extend south to the Black Sea and the parched, low-lying Caspian desert. The great plain is crossed by large, navigable rivers, none of which, however, can compare with the great rivers of other

continents in length or volume. In central Europe, where the plain is narrowest and the descent from mountain sources least gradual, rivers have a steady flow which prevents them from freezing in winter ; while in summer, fed by melting snows and glaciers, they escape the evils of drought. But in flat, wide eastern Europe, rivers, though longer and wider, rise in low, hilly country and flow sluggishly and often circuitously over the wider plain ; thus in winter they are regularly frozen, and in summer, through the meagre rainfall, sadly shallow. The special importance of the Danube has already been shown [215].

SCANDINAVIA

642. The mountain backbone has a profound influence upon the nature and destinies of the two countries composing the peninsula. It lies nearer the west coast than the east, so that Norway is mainly highland and Sweden mainly lowland ; it arrests the moist Anti-Trades, so that the Norwegian rainfall is heavy compared with the Swedish ; it shelters Norway from the cold north-east winds, enabling the warm Atlantic drift to keep her ports open all winter even within the Arctic Circle, while those of Sweden are frozen for three to five months. In short, it makes the climate of Norway oceanic, and that of Sweden continental. High latitude and great elevation make much of Norway too cold even for tree-growth [Fig. 117], so that, while half of Sweden is still forested, only one-fourth of Norway bears trees. Swedish pastures are also twice, and arable lands more than four times as extensive as those of Norway. Thus Sweden, with twice the population of Norway, exports more than four times as much wood and pulp, and almost fourteen times as much

butter; while Norway imports for food almost twice as much grain and meal as Sweden.

NORWAY

Area, 124,130 square miles (=Britain); population, 1910, 2,391,782 (= $\frac{1}{20}$ Britain).

643. Heavy snows and rains give rise to great glaciers and rivers which, owing to their steep descent, furnish no navigation but enormous water-power,¹ of which but a fraction is yet utilised. The deeply-fjorded coast provides many sheltered harbours and extensive fishing-grounds whose yield furnishes the second export in value, and which, with abundance of timber for ship-building, made the Norwegians a race of seamen (*cf.* Phœnicia, § 188). The most important **fisheries**² are those of the Lofoden Islands, and Bergen (76,867) ships most of the fish export. Down and feathers are collected, and whale-fishing yields train-oil. Agriculture is almost limited to small, isolated farms occasionally accommodated by a break in the steepness of the descent. Potatoes are the chief crop, followed by oats, barley and rye, for which the long summer days are a special advantage; but large imports—mainly rye—are necessary. Much of the barley is used by the breweries and distilleries of Christiania and Bergen. The limited pasturage, high and poor, supports sheep rather than cattle; but numbers of the latter graze on lower pastures, and condensed milk and butter are exported.

644. **Lumbering** yields the chief export [Fig. 26]. Fredrikstad and Drammen are the chief lumber ports, though Christiania (241,834), the capital, exports considerable quantities, as well as fish and ice. Wooden

¹ Estimated at almost 5,000,000 horse-power.

² Cod forms almost half of the total "catch," and herring one-fourth.

ship-building is still important, and the fact that imports are consistently about double the value of exports testifies forcibly to the extent of the Norwegian merchant marine, which is the largest in the world in proportion to population, and sells its services to every land. Extensive sulphur deposits have given rise to a large match industry, and imported hides supplement home supplies for tanning. Lime and carbon (derived from imported coke) make carbide of calcium, which is partly exported and partly made into nitrates. Rising imports of raw cotton and wool show the beginning of a great textile development which the moist climate and abundant water-power should foster.

645. Excellent iron is mined near Narvik, which exports ore from Gellivara [648] in winter. Low-grade ore at Dunderland, on a northern fjord, is now used by



FIG. 118.—SCANDINAVIA: CHIEF TOWNS AND COMMUNICATIONS.

a magnetic process [165], and ore has also been found at Vadsö. There are valuable copper deposits at Röros, on the Christiania-Trondhjem railway [Fig. 118], and silver is mined at Kongsberg. Trondhjem (45,335) is the winter port of Stockholm. Among **exports** wood and pulp share equally 30 per cent. of the total value, fish products—mainly salted cod and herring—yielding 25 per cent.; other items are paper, train-oil, hides and skins, condensed milk, calcium carbide, sulphur, zinc, bran, butter, matches and copper. Of the **imports** 15 per cent. is grain and meal, 15 per cent. textile fibres, and $12\frac{1}{2}$ per cent. iron and steel goods and machinery; and they include also coal and coke, textiles and yarns, coffee, sugar, hides and skins, petroleum and wine. Of the total trade 30 per cent. is with Britain, and 26 per cent. with Germany; Sweden, the United States and Russia follow.

SWEDEN

Area, 172,876 square miles (= $1\frac{1}{2}$ times Britain); population, 1911, 5,561,799 (= $\frac{1}{3}$ Britain).

646. Forests furnish much the largest export. Sweden is one of the chief **timber** sources [145], the deep snows in the continental climate facilitating, as in Canada, the winter transport of logs to rivers which float them down to the mills¹ in spring. Gefle is meantime the chief timber port, and the main centre of forest industries including the making of pulp, cheap furniture, and matches. The exhaustion of central forests is directing attention to great northern reserves which will benefit more northerly ports. Tar, pitch and turpentine are manufactured pine products (*cf.* § 546).

¹ The total water-power of the country, only partly harnessed, is estimated at 4,000,000 horse-power.

647. **Agriculture** is important in the rich alluvial soil of the centre and south. The chief crops are oats, rye, barley, wheat, potatoes and sugar-beet; but grain imports—mainly wheat and rye—are necessary. The excellent lowland grazing promotes **dairying**, which is highly organised [151, 152], butter and cattle being largely exported. Breweries and distilleries consume barley; local and imported hides support tanning and boot industries; and sugar is made from beet. The **fisheries**, formerly very rich, now yield but one-third of the return from those of Norway, the fish having largely migrated to the North Sea.

648. **Mineral wealth** is great, iron and steel and their manufactures forming the second export. The iron ore of Gellivara is exported in summer from Luleå, on the Baltic, and in winter from Narvik, on Ofoten Fjord [645]. The chief producing centres in the Dal basin are Dannemora, Falun and Gefle. Swedish ore, naturally very fine, is still charcoal-smelted, the consequent purity of the metal causing it to be valued for steel-making. Machinery (including locomotives) is important at Norrköping (46,629), the chief industrial centre, and elsewhere, as is ship-building at Stockholm (346,599), Gefle and Göteborg (170,606), the chief port. Copper is a valuable product of the Dal basin, silver and lead are obtained at Sala, and zinc at Ammeberg. Coal and coke are the chief import. Cotton and woollen mills are rising at Stockholm, Norrköping and Göteborg, but the climate is less favourable than the Norwegian [644].

649. Railway-construction has been facilitated by the flatness and cheapness of the land, and convenient supplies of both timber and iron. A train-ferry between Malmö (89,719) and Copenhagen completes the direct

connection between the Danish and Swedish capitals. The many southern lakes and rivers specially encourage water-transport. The 9-foot Göta Canal is the chief route, connecting Göteborg, *via* Lakes Wener and Wetter, with Söderköping, a distance of 180 miles. Of the **exports** 40 per cent. consists of wood and pulp, and 25 per cent. of iron and steel and their manufactures (including machinery); other items are butter, paper, live-stock, fish, matches, grain, glass¹ and zinc. Of the **imports** 10 per cent. is coal and coke, and 9 per cent. iron and steel goods and machinery; other items are textiles, apparel and yarns, grain and meal, cotton and wool, oils, coffee, skins, wood and its manufactures and fish. Of the total trade Britain and Germany share 60 per cent. equally, Denmark has over 8 per cent., and Russia, France, the United States and Norway follow.

RUSSIA

Area, 1,862,524 square miles ($\approx 15\frac{1}{2}$ times Britain); population, 1911, 120,588,000 ($\approx 2\frac{2}{3}$ times Britain).

650. Russia, with Finland and Poland, occupies considerably more than half the entire continent. The **forest-belt** is most extensive, covering quite 40 per cent. of the land; and widely differing types of vegetation reflect the many varieties of climate. Russia is so level that her **waterways**, although shallow in summer and frozen in winter [641], provide extensive cheap navigation. By river and canal goods may reach the Baltic from the Caspian and Black Seas, or the White Sea from the Caspian; and the cutting of an 80-mile canal from the Tsaritsin bend of the Volga to the Don would connect the Caspian with the Black Sea. These waterways provide in all over 50,000 miles of naviga-

¹ The product of an important industry, using extensive silica deposits.

tion ; but unfortunately—except through the White Sea, which is closed by ice for most of the year—they have nowhere a free oceanic outlet. The Caspian, an inland salt lake, is gradually drying up ; the narrow Black Sea and Baltic exits are controlled by foreign powers.

651. Forests and pastures provided the people with their main occupations long after other lands had extensively developed agriculture and industries. Serfdom was the main cause, but Nature's lavish gift of waterways postponed the construction of roads, for making which, in the south, neither wood nor stone existed ; and the cost of railway-construction was for long thought unjustifiable. Lack of roadways deterred traffic from reaching waterways in summer, and, when winter snows made sleigh-transport easy, rivers and canals were frozen. The abolition of serfdom was the beginning of a national awakening which, aided by the discovery of great mineral resources, fostered a wonderful spirit of enterprise ; and rapid railway-construction and low freights encouraged a marvellous agricultural and industrial growth.

652. Enormous forest-wealth has largely atoned for the want of water-power, charcoal being still an important smelter and steam-raiser ; but vast coal-fields have opened up greater possibilities. One phase of modern Russia's ambition is to make herself industrially independent, and a heavy protective tariff has carried her far towards that end ; meantime agricultural schools and experimental stations have greatly stimulated production, and special agents in every land seek markets for her goods. Two-thirds of the population is concentrated on the central and Polish industrial areas and the rich southern " black earth " region.

653. **Forests and Forest Industries.**—Lumbering

fulfils three great functions: it furnishes building material in a country singularly deficient in stone; it yields charcoal fuel for both domestic and industrial use; and it supplies the second export after grain and flour. It is naturally most important near rivers, and the Northern Dvina enables Archangel to lead in the export. Pitch, tar and turpentine are obtained from pine, as in Sweden; silver-birch and other barks support a great tanning industry; oak and beech "mast" feeds many swine; and furniture is made in most cities. Wood-pulp manufacture, hindered by the want of cheap water-power, has recently made progress. The yield of furs and skins is declining.

654. **Agriculture¹ and Agricultural Industries.**—Although the rainfall nowhere reaches 20 inches in the year, it occurs mainly in summer [640] and usually suffices for agriculture; but a dry season in the continental heat causes widespread loss and suffering (*cf.* India). From the Pruth to the Volga, a belt of rich "black earth," 200 to 300 miles wide, yields the heaviest crops. The western end covers Bessarabia, whose fruits and wine excel, and a rich tobacco-crop is manufactured at Kishinef. At the Volga end, tobacco is valuable from Saratof to Samara, the latter famed for cigars; and Crimean fruits and wine are important.

655. In Russia, rye is much the largest grain-crop, furnishing the staple grain-food; barley comes second, followed by wheat. Flax, notwithstanding the superiority of the fibre [110], was originally grown solely for seed, the oilcake being a valued cattle and peasant food. The fibre was thus almost entirely available for export, and Russia now supplies the world's markets with about twice as much as all other

¹ Twenty-six per cent. of the surface of the country is arable land.

flax-growers combined¹ [Fig. 22]. Maize is valuable, particularly in Bessarabia, where enormous numbers of swine are fattened. Potatoes are specially important in the cooler, moister Baltic region; sugar-beet covers 2,000,000 acres, mainly in Poland and Little Russia, where coal-fields support hundreds of refineries—notably at Kief (505,060) and Kharkof—furnishing a large export. Flour-mills flourish in the south, favoured by the dry climate. Baltic distilleries are important, notably at Riga and Reval, making “vodka” from rye and “brandy” from potatoes, and consuming also barley and sugar-beet.

656. Stock-rearing.—The unsuitability of the dry south-east for agriculture renders it essentially pastoral. Russia owns half the horses of Europe, and five times as many cattle and almost twice as many sheep as Britain; while Germany alone, in Europe, rears more swine. Dairying is little developed, cattle-rearing being regarded mainly as a source of hides and tallow, the former for extensive tanning industries where bark is available (as at Kazan, Kief, and Kher-son), and the latter for soap and candle industries. The pastoral area is, however, shrinking with the expansion of agriculture. **Fisheries** are most extensive, the yield being exceeded only by those of the Atlantic shores of North America and western Europe; but the “catch” has decreased one-third in fifteen years, and cod and herring are largely imported.

657. Minerals. — **Coal** is abundant, the southern Donetz field (bituminous and anthracite) being the most important. Polish coal will not “coke,” while the central field near Tula, though convenient for the Moscow industrial region, cannot compete with the

¹ One-fourth of the export goes to Britain.

Donetz product. The Ural field, in the Kama basin, near Perm, is not yet much drawn upon, but disappearing forests there render it important. At present four-fifths of the consumption is met by the home output, over 70 per cent. of which comes from the Donetz mines. **Iron** exists almost everywhere near both coal and limestone. Krivoi Rog, in the Dnieper basin, 100 miles north of Kherson, supplies about two-thirds of the country's demand. Most of the remainder is Polish ore from near Lodz, and fine and cheaply-mined ore from Finland. There is a rich field in the Kama basin, and a large field of low-grade Crimean ore near Kerch may be workable by the magnetic process [165]. Iron is also distributed throughout the central coal-field.

658. The Ural region is rich in other minerals still only partly developed. **Platinum** mines between Ekaterinburg and Perm yield 95 per cent. of the world's supply; the **gold** output near the former has been more than doubled in four years, the comparatively small **silver** yield having been increased tenfold in the same time. **Copper** production near both towns now supplies three-fourths of the country's needs. Zinc is mined in Poland, and mercury near Voronezh—a fact of importance to Ural mines. Half of the country's salt comes from lakes and marshes in the Caspian desert, and one-fourth from rock-salt deposits in the Donetz basin; deposits are also worked near Perm.

659. **Iron and steel industries** are most prominent round the southern and central coal and iron fields, and in the Petrograd¹ district, fed by ore from Finland and imported coal. The now excellent product is rapidly increasing, agricultural machinery being the

¹ Formerly St. Petersburg.

chief branch. Cutlery and arms are a special feature at Tula, guns at Perm, and textile machinery at Lodz; while ship-building is important at Odessa, Nicolaief and the exclusively naval port of Sebastopol. Convenient supplies are fostering a rapid development of various iron and steel industries, notably in agricultural machinery, at the leading Azof grain ports—Mariupol, Berdiansk, Taganrog and Rostof.

660. The development of **textile industries** is distinctly reflected by rising raw material and machinery imports [Fig. 119]. **Cotton** is the chief, giving two-thirds of the total output. In the central region Empire-grown fibre, brought overland, yields about two-thirds of Russia's cottons, the rest being made from imported American fibre in Poland (mainly at Lodz) and in the Baltic provinces¹ (including Petrograd). Cotton-growing is being specially encouraged so as to render American imports unnecessary [317].

Woollen manufactures are most important where pastures and "power" meet, as at Moscow and Tver (the head of steam navigation on the Volga), and at Kharkof and Poltava. Cheap foreign wool and the encroachments of agriculture on pastures are making the industry more and more dependent upon imported fibre. **Silk** manufactures are almost confined to the

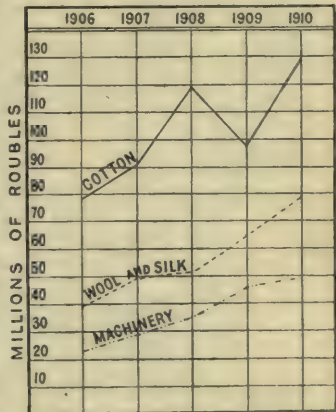


FIG. 119.—RUSSIA: FIBRE AND MACHINERY IMPORTS.

¹ Narva, with water-power, has the largest industry after Petrograd.

Moscow district, two-thirds of the raw material being Trans-Caucasian; and **linens** are made from Moscow to Yaroslavl and Kostroma. Despite the development of the factory system with modern machinery, much of the textile output is still "domestic"; but sometimes



FIG. 120.—RUSSIA: CHIEF TOWNS AND COMMUNICATIONS.

domestic workers, combining their capital, have established factories and secured at least a share of the profits of organisation.

661. Chief Towns and Ports.—**Petrograd** (1,962,400), the capital and a great industrial and commercial centre, is now accessible to large vessels formerly berthed at Kronstadt. **Moscow** (1,533,400), the industrial capital,

with vast forests to the north and coal and iron to the south, centrally situated on a vast plain, is an ideal collecting and distributing centre (*cf.* St. Louis), and has become the central focus of the railways [Fig. 120]. **Warsaw** (872,478), at the head of steam navigation on the Vistula, is the "gate" of Russia upon which railways from east and west converge. It is the third city and second industrial centre in the Empire. **Lodz** (408,330) is specially important as a textile centre, almost monopolising the Polish cotton industry, and manufacturing linen and woollens; and convenient coal and iron enable it to specialise in textile machinery.

662. **Archangel** (35,414), though closed by ice for seven months, trades largely in hemp, flax, oats and forest products with north-west Europe and America. **Tammerfors** (44,423), the "Manchester of Finland," with water-power and a moist climate, has important wood-pulp, paper and cotton manufactures. **Helsingfors** (143,382), **Abo**¹ (49,377) and **Hangö**² are all important Finnish ports; the last, one of the four remaining open all winter, being the winter port of Petrograd. **Riga** (331,300) exports grain, spirits, lumber and eggs, and imports British coal, much of which is used in its textile and machinery industries. **Reval** (73,083), free from ice five weeks longer than Riga, imports cotton and exports spirits. **Vilna** (190,210) is an important industrial town. **Ribinsk**, at the northmost bend of the Volga, the "Russian Chicago," receives enormous grain shipments by the Volga from eastern and south-eastern Russia for dispatch (in summer by river and canal, and in winter by rail) to Petrograd for export. **Smolensk** (70,911) marks the limit of navigation on the Kama.

¹ With a ship-building industry.

² Which exports butter largely.

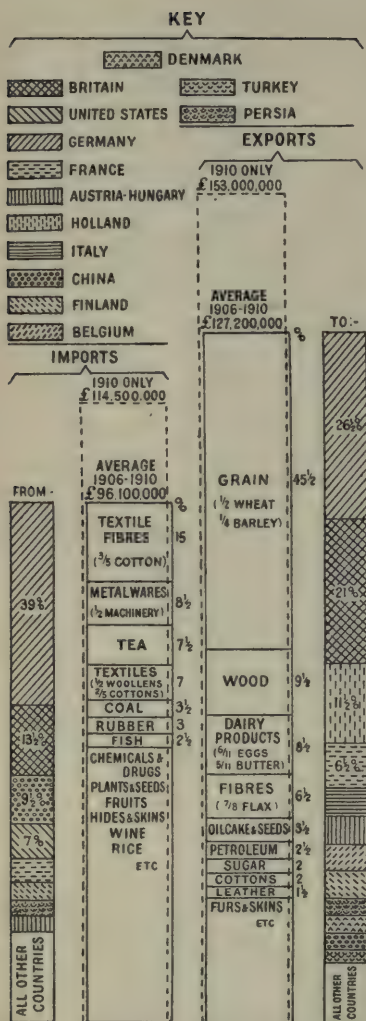


FIG. 121.—RUSSIAN EMPIRE: FOREIGN TRADE.

663. **Kazan** (188,100), on the Volga, the greatest egg-market, has many industries including tanning, distilling, and the making of boots and shoes, linens and candles. The "cigar" town of **Samara** (95,642), commanding railways to Siberia and Turkistan, is increasingly important. **Astrakhan** (144,231), commanding the Volga and the Caspian, is a great fishing port,¹ and handles oil from Baku and a considerable trade from Persia. **Odessa** (505,600), the main outlet for the rich southern agricultural region, has large flour-mills, breweries and sugar-refineries, and an important machinery industry. It is one of the four ports seldom closed by ice,²

¹ Sturgeon being the distinctive product.

² The other three are Sebastopol, Hangö and Windau.

and the harbour has been deepened to 30 feet; but its grain-trade has declined since the improvement of the entrance to more convenient **Nicolaief** (95,400) and **Kherson** (67,237).

664. A special feature of Russian commerce is found in the great annual fairs¹ held at various centres; but freer railway intercourse is lessening their importance. The **foreign trade** is shown in Fig. 121.

RUMANIA

Area, 50,720 square miles ($= \frac{5}{12}$ Britain); population, 1912, 7,248,061 ($= \frac{1}{8}$ Britain).

665. The rich plains of Wallachia and Moldavia repeat the "black earth" and general conditions of Bessarabia [654], producing fruit—especially plums—and grapes (for wine), and being one of the chief European grain-sources. One-third of the country is devoted almost equally to **wheat** and **maize**. The latter is naturally the heavier crop, but, as it forms the staple food and feeds enormous numbers of swine, wheat predominates as an export. Grain and flour furnish normally over 80 per cent. of the total exports, two-thirds being wheat. One-eighth of the country—including the Dobruja plateau—is meadow-land and pasture, and **stock-rearing** is increasingly important. Cattle are exported, horses are reared, and swine feed in the oak and beech forests which still cover one-sixth of the land and yield an important timber export. Abundant grain enables eggs to be largely exported.

666. The only important mineral is **petroleum**, whose production has increased six-fold in ten years. Industries have been retarded by want of coal, skilled

¹ *E.g.*, Nizhni-Novgorod, Kharkof, Kief, Poltava (wool and horses), and Irbit (furs).

labour and capital; and home-spun materials still supply most of the demand. Saw-milling, however, is important, also flour-milling, distilling, and tobacco-manufacturing; while hides are tanned and boots and clothing made. The paucity of towns on the Danube is due to the low, marshy character of the north bank; but **Braila** (64,730) and **Galatz** (71,719) collect and ship enormous quantities of grain, and **Sulina** dominates the best channel of the delta, which has been deepened to 18½ feet. **Bukarest** (338,109), the capital, centrally placed on the Wallachian plain, is the focus of the railways; and **Jassy** (75,882) is an important town. Of the imports 25 per cent. are textiles, and 25 per cent. iron and steel goods and machinery; other items are vehicles, leather and its manufactures, chemicals, coal, and rubber goods. Austria-Hungary, Germany, Belgium, Britain and Italy share most of the trade.

AUSTRIA-HUNGARY

Area, 241,277 square miles (= twice Britain); population, 1910, 49,458,421 (= 1½ times Britain).

667. The dual monarchy presents a gradual transition from industrial Bohemia to agricultural Hungary. Tardy industrial development is chiefly due to racial dissensions, the Empire containing a wonderful variety of races and languages; but contributory causes are also heavy taxation¹ and costly transport, the excellent inland waterways nowhere communicating with the Adriatic, where alone the Empire reaches the sea.

668. Three-fifths of the area is devoted to **agriculture**, which supports over two-thirds of the people. Climatic variations, due to topography, bring corresponding variations in production; thus, rye and oats predomi-

¹ Which will be heavily increased through the great German war.

nate in the cool summers of elevated Austria, maize and wheat characterising the greater heat of the low-lying Hungarian plain [Fig. 10]. The quality of the wheat and its flour creates a demand which, aided by agricultural education and co-operation, is inducing greater efficiency; and cheaper freights should encourage an important development. Already vast pastures are being brought gradually under the plough. Barley, potatoes and sugar-beet are important in both countries, and flax and hemp cover large areas, though suffering in competition with cheap and excellent Russian fibres.

669. **Fruit** products illustrate climatic differences most forcibly. Apples and pears typify northern parts; plums, the warm, sheltered Hungarian valleys; and olives, figs, and other Mediterranean products, the Adriatic provinces; while the **vine** attains perfection on sheltered Alpine slopes, and, more particularly, on the sunny southern Carpathian slopes, which yield the famous wines of Tokay. Both countries grow **tobacco** largely as a state monopoly [139]; and the culture of the **silk-worm** is extending in Hungary. Hops are important, four-fifths of the total yield being obtained near the Bohemian barley-fields, and supporting the famous breweries of Pilsen and Vienna. Carpathian and Bohemian **forests** yield wood for various industries, and staves for cask-making in France, Italy and Germany. **Stock-rearing** is important in both countries. The Empire possesses thrice as many cattle and almost thrice as many sheep as Britain, though the encroachment of agriculture on pastures, and competition with cheap and excellent Australian and South American wool are reducing the number of sheep. Cattle in Hungary and Galicia furnish meat and hides, and, in

Alpine valleys, dairy products. The Empire rears more swine than Russia, on oak and beech "mast" and maize, and almost as many horses as Germany.

670. **Minerals** are not extensively developed. The best **coal** is found in north-western Bohemia, and northern Moravia and Silesia, while lignite abounds in Styria and elsewhere. The output is not large. A considerable quantity—mainly lignite—is exported, but more than twice as much coal and coke is imported. **Iron** occurs frequently, but in particular purity in Styria and north-eastern Carinthia. The chief Styrian centres are Graz and Eisenerz, the latter having a literal mountain of very fine ore. It is unfortunate that the best iron and coal do not coincide, so that the fine Styrian and Carinthian ores are still charcoal-smelted, supporting various metal industries at Steyr, Graz and Klagenfurt; while the great northern smelting centres, notably Prague and Brunn, consume imported ore. Convenient access to both regions enables the Vienna district to predominate in iron and steel industries, including the making of machinery,—Graz, Prague, and Brunn sharing in the output. The Bleiburg **lead**-mines are the richest in Europe, as is also the Idria **mercury**-mine—after that of Almaden in Spain; but production from both is small. Gold, silver, zinc and copper might be more important. Galicia is rich in **petroleum**, and modern appliances and methods may enable it to compete with the cheap large-scale product of Russia. No country is richer in **salt**, but production might be much greater; the Alpine provinces and Galicia are the main sources, the Wieliczka bed of salt in the latter being described as 300 miles long and 1,200 feet thick.

671. **Other Industries.**—The **flour-milling** indus-

try in the dry climate is the largest in Europe; Hungary and Bohemia lead, Budapest being the chief centre. Careful grading [152] of the wheat secures uniform excellence of flour and a high reputation. In distilling, Hungary and Galicia lead, plum brandy being the distinctive product. Great **sugar**-refineries—mainly in Bohemia and Moravia—furnish (from beet) the third export [Fig. 13]. Olive oil is a large southern product. Textile industries, fed by imported cotton and home-produced wool and silk supplemented by imports, flourish on the northern coal-fields, mainly at Reichenberg, Pilsen, Brunn and Troppau; Vienna specialises in silks and carpets, and makes paper from textile waste. The forests furnish timber for bentwood furniture, which is largely exported; for fine cabinet-work, toys, and other fancy wares; and for wooden ship-building, which still thrives at Adriatic ports. Tanning and leather industries are extensive in Hungary, in the Tyrol, and at Vienna and Prague, kid gloves being a special product. The making of musical instruments is important. The Karlsbad porcelain industry utilises local clays, and the celebrated Bohemian glass is made mainly at Pilsen and at Eger, the necessary ingredients being conveniently near in the mountain forests (viz., fuel, potash, silica and colouring metals).

672. Chief Cities and Ports.—**Vienna** (2,031,498), the capital of the Empire, midway between northern and southern iron regions, between industrial Bohemia and agricultural Hungary, between the upper Danube navigation and the lower, and between Germany (*via* the "Moravian Gate"), and Italy and the Adriatic (*via* the Semmering Pass), is naturally a great industrial, commercial and financial centre. Flour-milling

Budapest (881,371), the Hungarian capital, stands on the Danube where it enters the great plain. **Prague** (223,741), where Bohemian valley routes converge upon the head of navigation on the Moldau tributary of the Elbe, has naturally become a great collecting and distributing centre. **Lemberg** and **Cracow** are important Galician towns dealing largely in grain, cattle, salt, and petroleum. **Trieste** (229,510), the chief port, accommodates ocean vessels drawing up to 30 feet; and one-third of the foreign trade is shared between it and **Fiume**, which handles grain and timber. The less convenient Cattaro has a better harbour than either; Pola is a great naval station, and Zara is an important fishing-port.

673. **Communications and Commerce.** — The

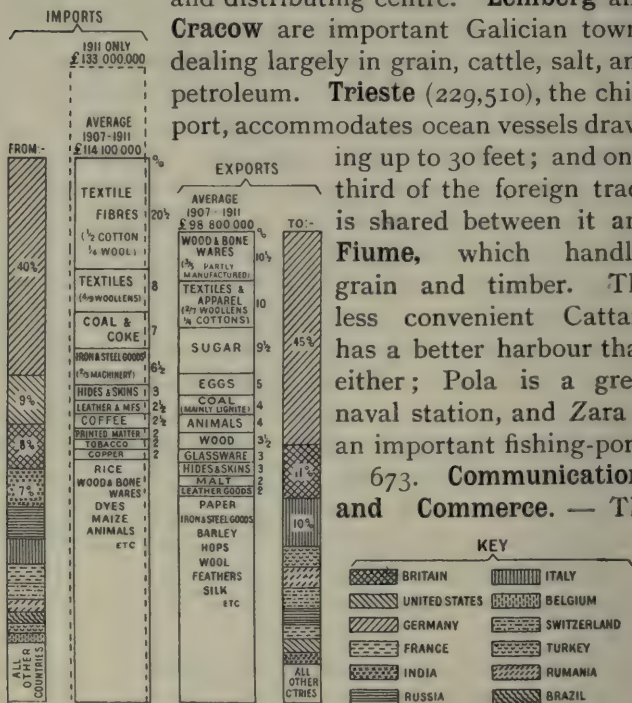


FIG. 122.—AUSTRIA-HUNGARY: FOREIGN TRADE.

Danube affords regular steam communication from Vienna to the Black Sea and to Ratisbon in Germany, and Prague is accessible *via* the Elbe from Hamburg and the North Sea. The Theiss may be ascended by

steamer to Tokay, the Save to Sissek, and the Drave to its junction with the Mur; while canals from the Theiss and the Save to the Danube facilitate the transport of grain to Budapest. The railway system is naturally focussed at Vienna and Budapest [Fig. 125]. The **foreign trade** is illustrated by Fig. 122.

SWITZERLAND

Area, 15,976 square miles ($=\frac{1}{8}$ Britain) ; population, 1910, 3,741,971 ($=\frac{1}{12}$ Britain).

674. Between the Jura Mountains and the Alps, which collectively occupy more than half of the Swiss surface, lies the central plateau—1,300 feet above sea-level—through which all the lakes but Geneva are drained to the Rhine, and to which agriculture and industry are almost entirely confined. The general height of the land has a cooling influence upon the climate, which is rendered moist by heavy rains secured by the mountains [Figs. 113 and 114]; and these facts are specially conducive to rich pastures and fine textile work. Ruthless deforestation, which has left few forests but those of the upper Rhine and Rhone valleys, is now being remedied by strict forestry laws and extensive afforestation.

675. The lower parts of the plateau and the many valleys, deeply covered with rich detritus brought down by snow-fed streams from the heights, produce grain, which, however, requires to be largely supplemented by imports. On the higher slopes sheep and goats feed, and furnish wool for cloth, and skins for kid and morocco leather; while the richer lower pastures make cattle-rearing for condensed milk and cheese ("Gruyères") more profitable even than agriculture, lowland hay being stored for winter food. Many milk

cattle are exported, mainly to Italy [251], fat cattle being imported for meat mainly from that country and Austria. In sheltered valleys fruit-trees (apple, pear and cherry) are profitable, and the vine is important on the sunny southern Jura slopes, supporting a large wine industry, the product of which, however, is again quite insufficient for the home demand. Flax and hemp are grown on the tableland, and tobacco is important in the warm, deep southern valleys, which also produce some silk. The country is almost entirely deficient in minerals, with the exception of rocksalt, building stone and asphalt; a little iron, however, is mined in the Jura range.

676. Isolated on all sides by foreign lands, and practically destitute of coal, iron, raw materials and navigable rivers, only marked intelligence, skill and organisation have enabled Switzerland to develop her marvellous **industries** by utilising her great wealth of water-power. Although the excellent railway system provides cheap carriage *within* the country, freight from and to the sea is heavy, and her manufactures, to compete successfully with those of other lands, must take the form of goods representing the expenditure of much labour and skill upon a small bulk of material. We thus find that exported textile and metal goods consist almost entirely of silks, fine cottons and embroideries, watches and clocks and machinery. Industrial growth has been fostered by an exceptionally efficient system of technical education, which, with the aid of power provided by many minor streams, enables even cottage-industries to play an important part.

677. Industries occupy one-third of the population, and most factories are driven by water-power, the chief centres being Zurich, Bern and St. Gall. Fine cotton

goods are made at Zurich, St. Gall and Glarus, and silk goods at Zurich and Basel, Switzerland following France and Germany in the volume of her silk industry. Woollen goods are also made, but the import exceeds the export. "Geneva"

watches and clocks, formerly hand-made, are now—under the compulsion of American competition—the product of a great machine industry, mainly at Geneva, Neuchâtel and neighbouring towns. Machinery is most important at Zurich, Winterthur and Geneva, the first-named specialising in textile, electric and hydraulic machinery; while Bern is famed for scientific instruments. Leather wares, especially boots and shoes, are important at Geneva, and are widely exported, kid and morocco being also produced. Cement, aniline dyes, carbide of calcium (*cf.* § 644) and aluminium are made, the last-named at Rheinfelden. Carved-wood articles are made by the peasants.

678. Communications, Chief Towns, and Commerce.—**Zurich** (189,088), the largest city and the capital of "German"¹ Switzerland, is also the chief industrial and railway centre, commanding many lines to surrounding countries. [Fig. 125]. **Basel** (131,914), at the

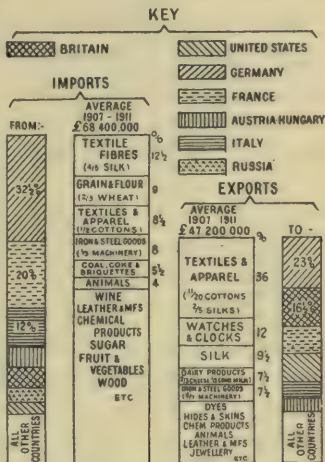


FIG. 123.—SWITZERLAND: FOREIGN TRADE.

¹ The fact that the French, German and Italian languages are all spoken in the country is of great commercial advantage.

head of the Rhine navigation, is almost as important as a railway centre. **Geneva** (125,520), the capital of "French" Switzerland, commands the trade with France, and is richly supplied with water-power for its many important industries. **Bern** (85,264), the political capital of the Republic, is centrally situated near the only coal-field. Excellent roads run in all directions, communicating by various passes with surrounding countries; and the many lakes provide navigation. The **foreign trade** is shown in Fig. 123.

THE GERMAN EMPIRE

Area, 208,780 square miles ($= 1\frac{2}{3}$ times Britain); population, 1910, 64,925,993 ($= 1\frac{1}{3}$ times Britain).

679. The German Empire is a confederation of twenty-six separate sovereign states. The Customs Union, or "Zollverein," by which the various states adopted a common commercial policy with internal free trade, was the economic bond from which the political union sprang at the time of the Franco-Prussian War, and from which only the "free ports" of Lübeck, Hamburg (with its outport Cuxhaven), Bremen (with its outport Bremerhaven), and Emden are exempt. The Grand-Duchy of Luxemburg, though an independent "buffer" state, belongs to the "Zollverein," its trade being included in German statistics.

680. The northern half of Germany is a low, exposed, sandy plain, subject to "continental" extremes increasingly severe towards the east, and productive only under the most scientific tillage. Much of it is still covered with forest,—mainly coniferous,—and extensive pastures graze cattle and excellent horses. The bleak climate makes rye the chief crop and staple food-stuff. The southern region is a plateau, rising gradually

towards the mountains; much of it, robbed by altitude of the benefit of the southerly latitude, grows more rye than wheat, though the excess is much less than on the northern plain; but much of it again, less exposed and more fertile, grows more wheat than rye, while sheltered valleys produce fruits, wine and tobacco. The relative freedom of rivers from winter frost or summer drought [641] has contributed largely to the development of the Empire.

681. Though possessing 1,200 miles of coast-line, Germany had, until recent years, only two ports of any size on the North Sea, both commanded by the island of Heligoland, then a British possession; and all her ports suffered more or less from obstruction by ice in winter (*cf.* § 663). These disadvantages have now been either largely neutralised or altogether removed by the acquisition of Heligoland, the construction of the Kaiser Wilhelm Canal and the use of ice-breakers; while a naval base has been established at Wilhelms-haven, whose harbour alone is never obstructed by ice, and a great new port has been created at Emden, close to the Dutch frontier. These developments, however, were justified only by the dominating position held by the country in the centre of the continent, which has been one of the chief factors in the marvellous industrial growth fostered by her great mineral wealth, her cheap transport by rail and water, her thorough and efficient system of technical, scientific, and commercial education, her policy of active State encouragement, and her heavy protective tariff.

682. **Forests**, two-thirds coniferous, still cover one-fourth of the surface [Fig. 124], mainly on the northern plain and in the Bavarian and Silesian highlands. They furnish timber for building and fuel; and, in

Bavarian and Thuringian towns,—especially Nuremberg,—for wood-carving, toy and pencil-making industries. They also supply material for glass industries in Bavarian and Silesian towns (*cf.* § 671). Timber imports are nevertheless extensive, staves for wine and beer barrels being a prominent item [669].

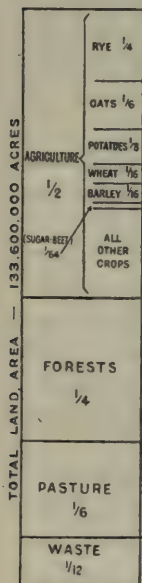


FIG. 124.—
GERMANY:
DISTRIBUTION
OF LAND.

683. The extensive **pastures** [Fig. 124] are also mainly on the northern plain and the bleak Bavarian plateau. Russia alone, in Europe, rears more cattle, and the abundant animal food furnished by refuse of beet-sugar and potato industries enables **dairying** to be important, and cheese—mainly from Schleswig-Holstein, the lower Rhine basin and southern Bavaria—to be an export. Millions of horses are raised, those of north-east Prussia being specially valued as cavalry mounts. No other country in Europe raises so many millions of swine, and abundance of food is fostering an increase: while grain-food has earned a high reputation for Westphalian hams. Sheep-rearing is extensive, but encroachments of agriculture upon the pastures and competition from foreign wool have reduced the number by 25 per

cent. in five years (*cf.* § 669). Goats are everywhere reared in the highlands for milk and skins.

684. Industries, despite their phenomenal growth, engage only 15 per cent. more people than **agriculture**, which utilises half of the total area [Fig. 124]; yet Germany has long passed the self-supporting stage, and grain is the chief import. Rye is much the largest

crop, oats and potatoes following. Germany is now the largest potato-grower, raising as many tons per head of the population as Ireland. The potato is an important peasant food, and is cheaper than maize as an animal food; it is used in distilleries for making "brandy" (*cf.* § 655) and motor spirit, and it yields also increasing quantities of starch, flour and sugar, the residue—like that of sugar-beet—being a valuable animal food. The wheat area is comparatively small, and Germany follows Britain as an importer [Fig. 12]. Most of the barley is consumed by the great brewing industry, mainly in Bavaria, where the sheltered valleys yield hops,—Munich enjoying a world-wide reputation.

685. The sugar-beet is most prominent in Silesia, in the lower Oder basin from Frankfurt to Stettin, round the Harz Mountains from the middle Elbe to the middle Weser, and in the Rhine valley. Germany is the largest grower and the largest maker and exporter of beet-sugar [78]. There are hundreds of factories, many of them co-operative; and cheap lignite (for fuel) and water transport play an important part in the industry. Magdeburg, Brunswick and Hanover are the chief centres. Flax and hemp are grown in the upper Danube, upper Elbe and Rhine valleys, but the output is largely supplemented by imports. The vine is extensively cultivated in the sheltered Rhine valley, and particularly in those of its tributaries, the Neckar and the Moselle, whose light wines are famed; but the total output is small compared with that of France, more being imported than produced. The vine country—"the garden of Germany"—bears also millions of fruit-trees, mainly plum, apple, pear and cherry. Tobacco, most important in the upper Rhine valley, is inferior to that of Hungary, and more is

imported than grown. The **fisheries**, though less extensive than those of France, are considerable, and support curing industries at many ports.

686. **Minerals**.—Germany's mineral wealth is great, particularly in the coal and iron so necessary to industry. The Ruhr valley **coal-field** is perhaps the richest in Europe; Dusseldorf, Duisburg, Dortmund and Ruhrort lead in production and shipment. Other extensive fields exist in Silesia, in the south-east and near Breslau; in Saxony, near Zwickau; in Rhineland and Lorraine, in the valley of the Saar; and in Rhineland, round Aachen. Production has already been dealt with [Figs. 32 and 33]. **Lignite**, which furnishes cheap fuel for many industries, is extensively mined in Saxony, in the Elbe valley, and in the Thuringian states, where it has given rise to a large petroleum industry. Considerable **iron** is found some fifty miles south of the Ruhr coal-field, but the best ore comes from the Harz Mountains; the largest fields, however, are those of Alsace-Lorraine and Luxemburg, both yielding inferior ore which became of value only in 1894 [166]. Ore is also obtained near Saxon and Silesian coal-fields.

687. Zinc is found at Aachen—a continuation of the Belgian field [712]; but five-sixths of the total output comes from Silesian mines at and near Königshütte, which are the world's chief source of supply. Copper and silver are mined in Saxony and in the Harz Mountains, Germany producing more silver than any other country in Europe [Fig. 37]; but the home demand for copper necessitates heavy imports. Some lead is mined, and petroleum is an increasing product both in Hanover and in Alsace. Salt is of special importance in the valley of the Saale tributary of the Elbe, Schönebeck being the largest centre. Above the rock-salt at Stassfurt is a thick deposit of mixed potash

salts which, formerly discarded as useless, now form the basis of great chemical industries.

688. **Industries** derived a great impetus from the war indemnity in 1871; and their development has been aided by many influences [681]. In many branches Germany, formerly dependent upon foreign imports, was able, prior to the war of 1914, not only to satisfy the home demand, but to furnish increasing exports, which competed successfully with products of other lands. Particularly was this true of the iron and steel trades and the textile industries, from which her chief exports have been latterly derived; while perhaps the most notable development of all is seen in ship-building, the value of shipping purchased by Germany from Britain in 1909 having been but one-fifteenth of that purchased four years previously.

689. The juxtaposition of iron and coal firmly established the **iron and steel trades** on the various coal-fields, but particularly on the Ruhr valley field, the nearest to the sea. Fine Spanish and Swedish ores are imported, but the main supplies come from the iron mines to the south, from the Harz Mountains, and, in enormous quantities, by river from Alsace-Lorraine and Luxemburg, coke being sent in return (*cf.* § 555). The iron-works of these states also draw upon the Saar coal-field for fuel. The Ruhr district thus contains a marvellous concentration of coal and iron towns. Gelsenkirchen is the chief coke-making town (*cf.* Connellsville, § 762). All kinds of iron and steel products, including machinery, cannon and guns, are made at the great Krupp works at Essen,¹ while Remscheid and Solingen specialise in the making of steel weapons and cutlery, as does Iserlohn in needles. The industries of Saxony, besides using local ore,

¹ *Cf.* Seraing [712] and Le Creuzot [724].

attract Spanish and Swedish ores up the Elbe. The output of iron and steel has been discussed [166; 167].

690. **Machinery** and locomotive industries are prominent at Chemnitz, Berlin, Cologne and other great railway centres, and textile machinery at most great textile centres in the Ruhr valley, Saxony, and Silesia; electrical apparatus is a special product at Berlin, Nuremberg and Frankfurt-on-Main, and scientific instruments at Munich. The ability of such products to stand the cost of freight enables them to be made even at a distance from the source of raw materials (*cf.* § 676). The greatest **ship-building** yards are at Stettin; but the industry is also extensive at Hamburg, Kiel, Lübeck, Rostock, Flensburg and Danzig, and river steamers are built at Dresden and other river ports within convenient reach of metal. The great Kiel naval yards belong to the Krupps, the vast works at Essen supplying all the material from the smallest bolts to the engines and the largest guns.

691. **Textile industries** follow the iron and steel trades in importance. Domestic spinning and weaving still linger—particularly in the Saxon and Silesian highlands. The dryness of the climate renders artificial suffusion of the mills necessary except in the Ruhr valley and in the Saxon highlands; but, as it is impossible to reproduce *perfectly* the naturally moist British air, German textiles, speaking generally, do not compete seriously with *finer* British products. **Cotton** is the chief branch, Germany having become the second importer of raw cotton [Fig. 20]; and convenient Bremen—Emden is but a recent creation—became the great cotton port and market. Cotton-mills have grown mainly in three districts—Rhineland-Westphalia, Alsace and Saxony—Alsace having the advantage of water-power as well as convenient coal;

and the leading centres are the twin city of Barmen-Elberfeld—the “German Manchester”—Dusseldorf, Cologne, Mülhausen, Chemnitz and Zwickau, the last two towns specialising in hosiery and lace (*cf.* § 690).

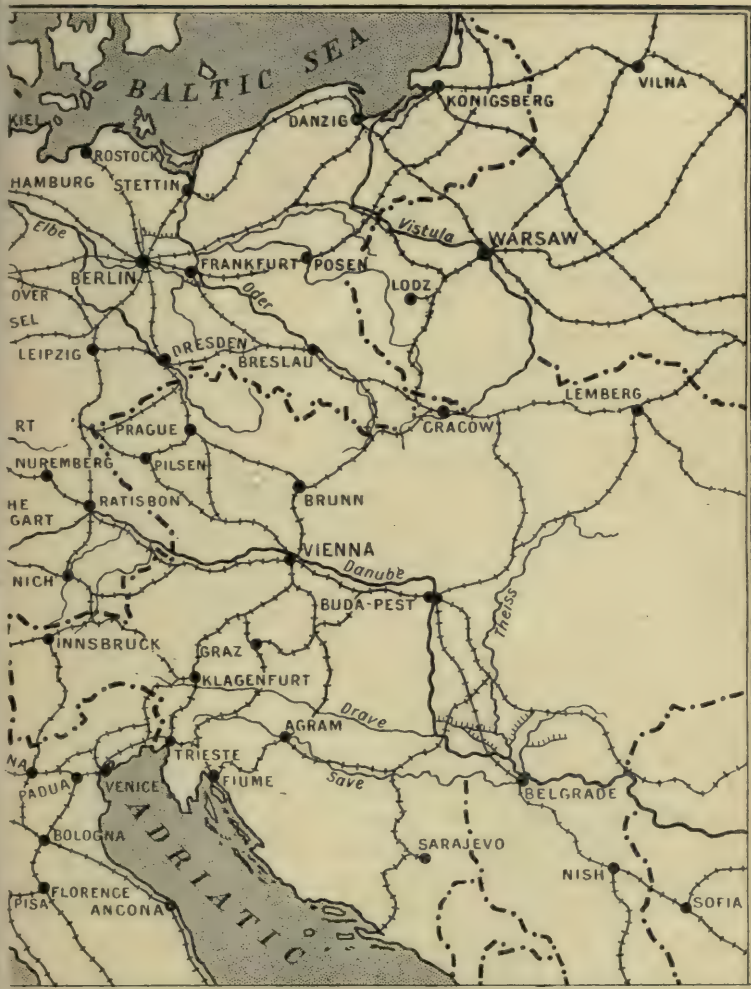
692. **Woollen** manufactures use local fibre in Saxony and Silesia—Chemnitz, Gorlitz, Liegnitz and Breslau being the chief centres, the first two specialising in hosiery, underwear and shawls. Imported wool feeds the industry of Rhineland, where Aachen leads. In **silk** manufacture Germany now comes third. Krefeld follows Lyons in silks and velvets; but there are many centres from that town to Neuss, and Cologne takes part. **Linen** goods are made chiefly at Bielefeld, from local and imported Belgian flax, and at Hirschberg, in Silesia, from Saxon and imported Russian flax. **Jute** is largely made from imported Indian fibre.

693. The growth of **chemical industries** is an eloquent proof of the value of education and research to industry, as they utilise otherwise waste products [687] and produce chemicals necessary to agriculture and to many other industries, *e.g.*, soap-making, dyeing, bleaching. Stassfurt has the largest chemical works in the world, other important centres being Barmen-Elberfeld, Bonn, Stuttgart, Leipzig and Berlin. **Leather** industries, using large quantities of imported hides and skins as well as home supplies, are important in Alsace and Saxony, and in Luxemburg, where fine gloves are a speciality. Fine china-clay at Meissen supports the celebrated “Dresden” **potteries** there, coarser wares being produced, along with glass, in the Thuringian states. **Rubber** goods are largely made, the German raw import being exceeded only by those of the United States and Britain [Fig. 25]. The **pianos** of Berlin, Stuttgart, Leipzig, Dresden and other centres are famed.

694. **Communications** in Germany owe their special



FIG. 125.—CENTRAL EUROPE



----- CANALS

..... FRONTIERS

COMMUNICATIONS.

completeness to the flatness of the country. Roads everywhere are excellent, and freights by rail, river and canal are cheap, thereby conducing largely to development. Waterways, though hardly so extensive as those of France, convey double the tonnage, furnishing some 8,500 miles of navigation to a fleet of over 25,000 vessels of various sizes. By the **Rhine** small ocean steamers carry grain and ore to Mannheim and Frankfurt, and vessels of 400 tons may reach Strassburg, whence canals connect with the Rhone and northern French canals [Fig. 125]. By the **Dortmund-Ems Canal** 750-ton vessels may now reach Dortmund, much foreign trade now following this route. Large ocean vessels ascend the **Weser** for 50 miles to Bremen, and smaller craft almost to Kassel. The **Elbe** takes the largest steamers to Hamburg; and 400-ton vessels reach Prague, and—by the **Oder**—Kosel, in Silesia. The value to Berlin of the Elbe-Oder canal may be gauged by the fact that half of that city's trade is water-borne. The **Vistula** is navigable by 400-ton steamers to Bromberg, whence, by a canal, the Oder may be reached.

695. The **Kaiser Wilhelm Canal**, 61 miles long, offers a safe and easy route between the Baltic and the North Sea for 28-foot vessels. Of projected canals the most important will connect Dortmund with the Rhine, admitting traffic from Emden to that river. The **railway system**, which is most extensive, is almost entirely in the hands of the State. The network is closest in the industrial regions, and lines from all sides converge upon Berlin, whose central situation has made it the natural capital. Railway rates, as has been said, are low, the system *supplementing* and not competing with the waterways.

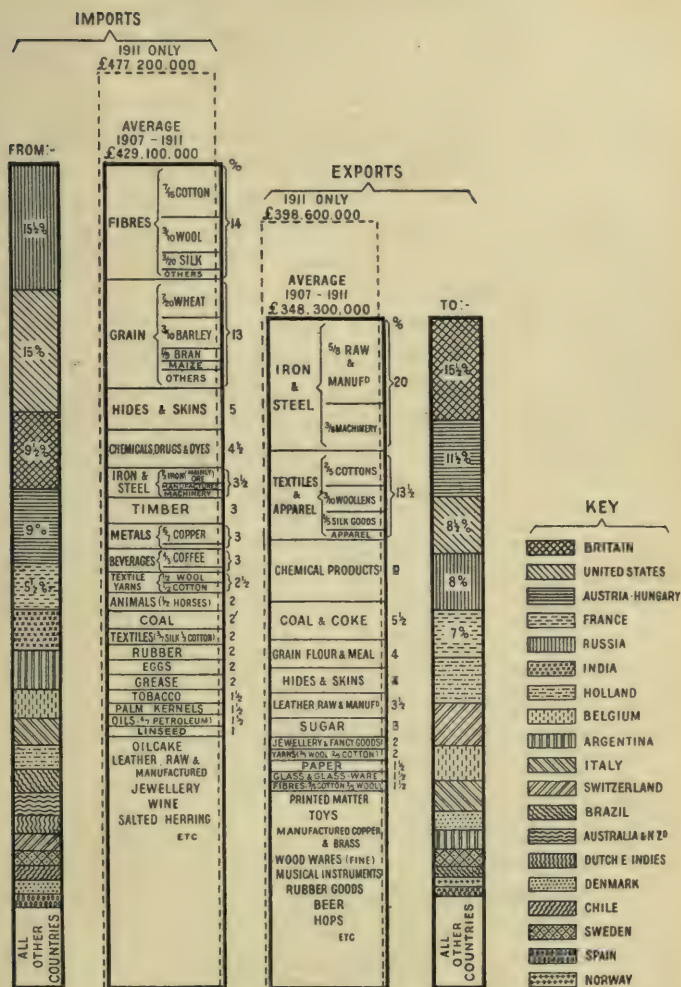


FIG. 126.—GERMANY: FOREIGN TRADE.

696. **Chief Cities and Ports.**—**Berlin** (2,071,257), the capital, commanding roads, railways and waterways in all directions, takes a prominent part in all branches of industry, and is the commercial and financial centre. **Hamburg** (931,035), the second city and chief port, is excelled in the volume of its trade only by London, Liverpool and New York. The port, kept open in winter by ice - breakers, transacts almost half of the entire foreign trade. **Munich** (596,467), the third city and the Bavarian capital, is one of the chief grain markets, and the chief brewing centre. Many German lines converge upon it *en route* for Italy and the Adriatic *via* the Brenner Pass [Fig. 125]. **Dresden** (548,308), the fifth city and the Saxon capital, lies where mountain routes from Bohemia converge upon the navigable Elbe, convenient

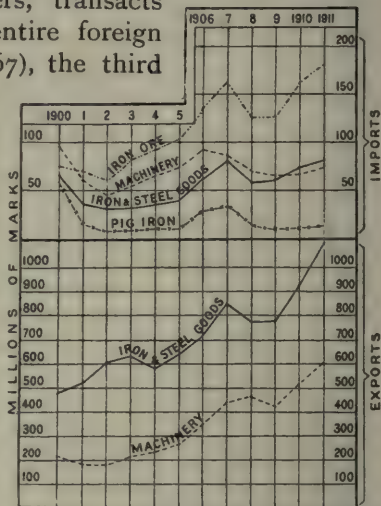


FIG. 127.—GERMANY: IRON AND STEEL IMPORTS AND EXPORTS.

coal supporting its many industries. Roads and railways converge upon the university city of **Leipzig** (589,850), which is therefore a great commercial centre and producer of books; it is the fourth city, and convenient pastures and tanning-barks make leather the chief industry. **Breslau** (512,105), a great textile and machinery centre, stands centrally on the navigable Oder, by which it receives western manufactures for distribution

throughout Silesia, and ships large quantities of raw material.

697. **Cologne** (516,527), practically an ocean port on the Rhine, is a great industrial centre commanding "through" lines from France to Germany. **Frankfurt-on-Main** (414,576), formerly the financial centre, is an important railway junction in a great wine country. **Nuremberg** (333,142), in a depression upon which valley routes converge, is an important railway centre and the chief Bavarian manufacturing city; and **Augsburg** (102,487) is the chief Bavarian commercial centre after Munich. At **Hanover** (302,375) the chief industries are sugar-refining and textiles; industrial **Stuttgart** (286,218) is the chief south German trading centre; and **Mannheim** (193,902), an important river junction, has a large foreign trade, exporting Neckar valley timber and south German manufactures.

Bremen (247,437),

the second port, is engaged, like Hamburg, in trans-Atlantic trade, but handles a tonnage only one-eighth as large. Ice-breakers keep the port open in winter. **Stettin** (236,113), with its out-port, Swinemunde, handles almost as much trade as Bremen, mainly Russian grain and timber imports, herring from Britain,

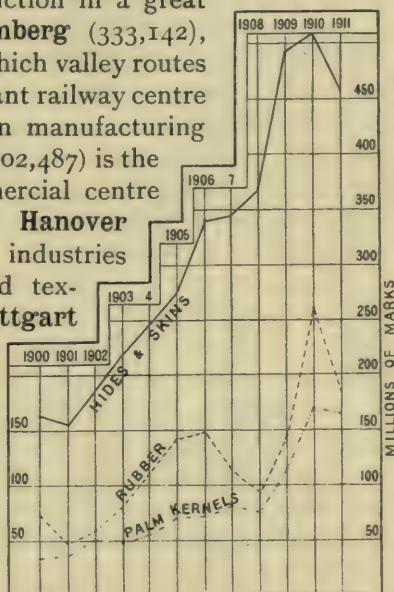


FIG. 128.—GERMANY: NOTABLE INCREASE IN IMPORTS OF RAW MATERIAL.

and sugar exports. **Emden** handles an increasing trade formerly sent by the Rhine through Holland, and should greatly benefit when connected with that river by the new canal. **Lübeck** (98,656) imports petroleum, timber and grain from Russia, and the last two also from Sweden. **Danzig** (170,337), **Königsberg** (245,994) and **Memel** export timber, grain, flax, potatoes and other products, many of which come from Russia.

698. The total **foreign trade** [Fig. 126] has recently increased 70 per cent. in ten years. It is significant of the development of the Empire that imports of grain and raw material have increased much more rapidly than those of manufactured goods, a comparison of figures relating to iron and steel goods and machinery being particularly striking [Fig. 127]. The increase in the import of certain raw materials has been exceptionally rapid [Fig. 128]. Palm kernels are notable as a special line, the invention of machinery for crushing them accounting for the exceptional development. German **imports from Britain** have been mainly cotton and woollen goods, coal and coke, iron and steel goods (with machinery), herring and wool; and her **exports to Britain** mainly sugar, cotton and woollen goods, and iron and steel goods and machinery.

DENMARK

Area, 15,582 square miles ($= \frac{1}{8}$ Britain) ; population, 1911, 2,775,076 ($= \frac{1}{16}$ Britain).

699. One-fourth of Denmark is peat-bog, or—in the west—covered with sand blown inland since the removal of protecting forests; elsewhere the soil, everywhere low, flat, and sandy, has been rendered fertile only by skilful scientific cultivation (*cf.* § 680), facilitated by the smallness of the holdings. The moist and often

foggy summers favour root-crops, hardy grains and pasture rather than wheat; and the country, having neither coal nor water-power, is thus essentially agricultural and pastoral, its flatness offering easy and cheap transport by land and water. Oats are the chief crop, assisting the pastures to rear army horses for export. Rye takes the second place, forming the staple grain-food; but large imports are required in addition. Barley supports breweries and distilleries at Copenhagen and elsewhere, besides furnishing a considerable export. Wheat is grown, despite the unfavourable climate, scientific attention securing the very high average yield of 42 bushels per acre [65]; but a large import is necessary. Sugar-beet is the chief root-crop, feeding refineries—*e.g.*, at Copenhagen. Potatoes are largely raised.

700. Dairying, poultry-farming and stock-raising yield 85 per cent. of the exports. Co-operative methods [151] are highly developed, and the excellence of the various products is maintained with the utmost strictness. **Butter** alone forms nearly 40 per cent. of the total exports, Denmark being the largest exporter [153]. Britain is the chief customer, but it is shipped to many different parts of the world, being even packed in air-tight tins for the tropics. **Meat** and **bacon** form over 25 per cent. of the exports, Denmark being one of the chief sources [148], and horses and beef cattle provide 10 per cent.; while enormous numbers of excellent eggs are shipped—mainly to Britain [154]. The pastures yield wool and skins for the industries of Copenhagen and Odense and the glove-factories of Randers, these and industries already mentioned necessitating substantial coal imports. The mackerel and sprat fisheries of the Skager Rak yield a con-

siderable surplus for export; and fine chalk, the only mineral, is exported.

701. Denmark's commanding position at the Baltic entrance is of great commercial value, and **Copenhagen**¹ (559,398), the capital, and the only port accommodating large vessels, has become a great emporium for Baltic trade, goods being increasingly transhipped between ocean steamers and smaller Baltic vessels. Trains are conveyed by ferry across the Sound to Malmö for Stockholm [Fig. 118]. **Aarhuus** and **Aalborg** collect and ship most mainland produce to Copenhagen, the only western port—**Esbjerg**—shipping cattle direct to Britain. A ship-canal through the Liim Fjord is proposed, with a new port at the western end. Elsinore has declined since tolls on vessels passing through the Sound ceased to be exacted. Large vessels use the deeper channel of the Great Belt. Train ferries between the mainland and Fyen and between Falster and Seeland facilitate communications, the latter being specially useful to German traffic *via* Rostock. The Faroë Islands yield wool and eiderdown, Iceland supplies cattle, sheep, fish and sulphur, and Greenland the oil and skins of seals, furs, eiderdown and cryolite.²

702. **Foreign Trade.**—**Exports** not already named are hides and skins, lard and fat, and seeds. Of the **imports** grain (mainly maize and rye) forms 11 per cent., oil-cake and meal over 8 per cent., and textiles and yarn 7½ per cent.; other leading items are coal and coke, iron and steel goods, wood, oil and other seeds, hides and skins, coffee, oil, various metal wares and live-stock. Britain has two-fifths of the total trade, and Germany, the United States, Sweden and Russia follow.

¹ Made a "free" port in 1894.

² Used for the manufacture of soda at Philadelphia, U.S.A.

THE NETHERLANDS

Area, 12,648 square miles ($=\frac{1}{10}$ Britain); population, 1911, 6,022,452 ($=\frac{2}{15}$ Britain).

703. The Netherlands, an important "buffer" state, more commonly called "Holland" from the western province of that name, are entirely low and flat. Almost half the country lies at or below sea-level, and is kept from flooding only by high dykes along the seashore and river and canal banks, and by constant drainage by windmill pumps. Many of these protected lands or "polders" have been actually reclaimed from the sea,¹ and all of them, composed of alluvial mud deposited through ages of time by the Rhine and the Maas, are of exceptional fertility. Much of the east, however, especially north of the Rhine, consists of poor peat stretches and grass-land productive only of wool.

704. Through the absence of hills, the moisture brought by prevailing winds is frequently only partially condensed, hence the moist, cloudy and often foggy climate which, like that of Denmark, favours the growth of hardy grains, root-crops and grass rather than wheat; and the extraordinary richness of the polders yields heavy crops of rye and oats, potatoes, sugar-beet, bulbs and flax, and rich grass on which (with oats) are fed excellent horses and, above all, enormous numbers of milk cattle. Vegetables, peas and beans, and—mainly in the south-east—wheat and barley are also raised, and some rather second-rate tobacco; but the joint use of rye and wheat as a bread-stuff requires large imports of wheat and flour [Fig. 12].

705. The country has neither timber, stone nor minerals, with the exception of a little coal at Limburg,

¹ The Zuider Zee, once so reclaimed and lost by flooding, is again in process of being reclaimed.

and clay, which supports the glazed earthenware industry of Delft, the brick and tile works of Zutphen, and the pipe-works of Gouda. Cheap ocean freight, however, facilitates the import of building-stone and timber, the want of coal and water-power being to some extent atoned for by the regularity and strength of the winds that sweep unobstructed over the flat surface and drive thousands of characteristic wind-mills. Cheap coal and iron, moreover, are conveniently obtained from Britain, and from Germany by the Rhine. Natural conditions thus combine to emphasise agriculture and pasture, while the situation of the country as the "gate" to central Europe, and its vast East Indian possessions, equally emphasise commerce; the ease and cheapness of transport by land and water facilitate both callings. The network of canals is most extensive, furnishing navigation, irrigation when required, and drainage for the polders, besides acting even as farm boundaries; and their extent and usefulness has largely rendered railway construction—however easy—unnecessary, the continental "through" lines alone being noteworthy [Fig. 125].

706. Dairying is most important, both **butter** and **cheese** being excellent and largely exported [Fig. 30]. The former is most prominent east of the Zuider Zee, the product of Groningen being considered the finest; cheese predominates west of the Zuider Zee, Edam and Gouda both contributing enormously to the great cheese-market of Alkmaar. Fishing is also important. The shelter of coastal islands, the shallowness of intervening channels and abundant fish-food brought down by rivers promote the growth of oysters, and attract herring and sprats; while cod are obtained from the North Sea banks. Of the various industries depending

upon agriculture the chief is sugar-refining from home-grown beet and imported Javan cane,—Amsterdam, Rotterdam and Utrecht leading. Brewing is important at Arnhem, where some hops are grown; and distilleries at Amsterdam, Rotterdam, Utrecht, Dordrecht and other centres consume both sugar-beet and potatoes. The famed “Hollands” gin is a special product of rye at Schiedam and Rotterdam, where the liqueur known as “Curaçao” is made and flavoured with bitter oranges from the Dutch island of that name off the Venezuelan coast.¹ Linseed and imported cotton-seed feed the oil-mills of Delft. Tobacco and cigars, mainly of imported East Indian leaf, are produced at Rotterdam, Amsterdam and Utrecht; and artificial butter is made at Gouda.

707. The pastures supply material for tanneries, woollen-mills at Utrecht and elsewhere, and carpet-works at Deventer; the flax-crop is partly exported for lace-making in Belgium, and partly consumed in the linen-mills of Tilburg and Haarlem, which still produce the well-known brown “Holland”; and imported cotton feeds the mills of Almelo, Enschede, Hengelo, and other eastern towns which also weave linen. The timber industries of Dordrecht use German supplies *via* the Rhine; paper is made at Apeldoorn; and diamonds are cut and polished at Amsterdam, though much of the industry has been lost to Antwerp.

708. **Communications, Chief Towns and Ports.**—**Amsterdam** (580,960), the capital and chief city, though still far behind Rotterdam as a port, has benefited greatly by the opening of the North Sea Canal [Fig. 125], which made it accessible to ocean vessels, and by the more recent Rhine Canal connecting with that river. **Rotterdam** (436,018) is the second city and chief port.

¹ And also, latterly, oranges from Seville.

The New Waterway to the North Sea, which brings to it the largest vessels independently of the Rhine mouth with its troublesome shifting shallows, has enabled it to benefit fully by its command of that river and its greater convenience as compared with Amsterdam for the English Channel; and it handles almost three-fourths of the entire foreign and transit trade. It also profits greatly by its connection with Belgian

waterways *via* the Sud Guillaume Canal. **The Hague** (288,577) is the legislative centre, and a handsome resi-

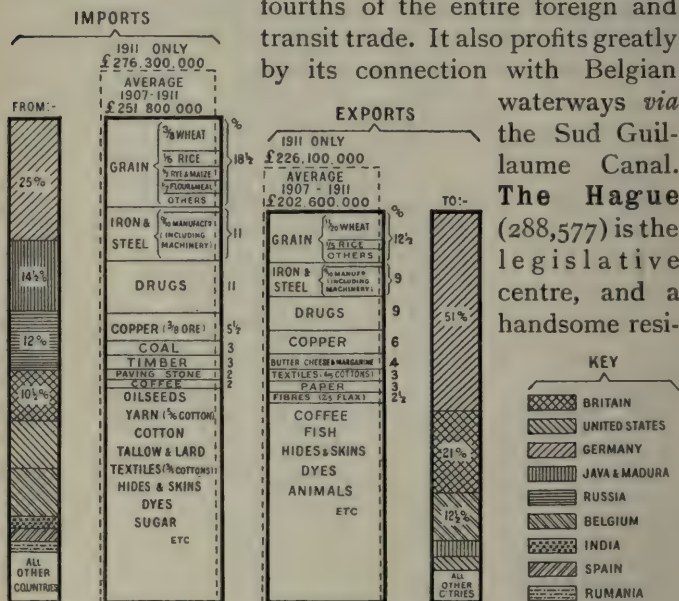


FIG. 129.—HOLLAND: FOREIGN TRADE.

dential city; **Utrecht** (121,317) is the fourth city, and chief textile centre; and **Groningen**, the “butter” town, will become important on the deepening of the canal to **Delfzijl**, which is to be made a port of the first rank because of the development of Emden [681]. Flushing (Vlissingen) and the Hook of Holland share the direct “through” trade between England and Germany.

709. Much of the **foreign trade** [Fig. 129] consists of the import and re-export of Dutch East Indian produce. The transit trade with Germany and, to a less extent, that with Switzerland and Austria are important, though the German share has dwindled considerably since the creation of Emden. These facts make it difficult to gather from trade statistics a true idea of the "special" foreign trade of the country.

BELGIUM

Area, 11,373 square miles ($=\frac{1}{11}$ Britain) ; population, 1910, 7,423,784 ($=\frac{1}{8}$ Britain).

710. Belgium, like the Netherlands, is an important "buffer" state. Three-fourths of the surface is so level that land and water communications have been highly developed, the position of the country guaranteeing it much of the transit trade of central Europe with France, Britain and America. Most of the north is either polders,¹ towards the sea,—as in Holland,—or occupied by the Campine, towards the west,—a low, sandy plain made productive only by irrigation and thorough scientific cultivation facilitated by the smallness of the holdings (*cf.* § 699). The canals, as in Holland, serve the treble function of navigation, irrigation and drainage. The south-east is highland, forming part of the Ardennes, which occasionally rise to over 2,000 feet, with valleys cut so deeply that navigation penetrates far into the highlands and even, by the Meuse, beyond the frontier.

711. The moist, cloudy climate of the west and north (*cf.* Holland) makes rye the chief crop, and aids the growth of potatoes, and rich grass on which the finest

¹ A large area was deliberately sacrificed by flooding, in 1914, during the heroic struggle against the invading German hordes.

draught horses are raised in the west (Flanders and Brabant) and milk cattle in the east (the Campine). Oats form the second crop, as in Holland. In the drier, sunnier centre, the sugar-beet is important; and barley, grown mainly between Louvain and Brussels, supports large breweries at those cities using hops from the Sambre valley. In the centre, also, and in the exceptionally rich Meuse valley, wheat is grown. Grain production, however, is quite inadequate for the dense population, and grain and flour form the chief import. Chicory is grown round Bruges. Large home markets make market-gardening and poultry-rearing profitable, abundant grain conducing to the latter; and poultry and eggs are exported to Britain. Butter is a special product in the Campine. The exceptional suitability of the soil of Flanders for flax-growing, and of the Lys water for retting, make the fibre of that region the finest in the world, and an important source of supply for the linen industries of Britain, Germany and France. Hemp and rape-seed (or colza) grow in the same district.

712. The great **mineral wealth**, however, has made industry predominant, and Belgium, for its population, is the most intensely industrial country on the mainland of Europe. The great **coal-field** extends from the upper Scheldt (round Fontenoy) across the Sambre and Meuse valleys into Germany (round Aachen), being particularly rich in the Sambre valley from Mons to Charleroi. Exports to France are large, but shipments from Britain for the industries of Flanders are larger. Rich **iron** and abundant lime are found on this coal-field from Charleroi to Verviers, but the output of ore is far from sufficient, and large imports from Luxemburg [686] result. The chief centre of the iron

and steel industries is Liège with its suburb Seraing, where cannon and small-arms, all kinds of machinery, general hardware and railway materials are made. Seraing is, in fact, the "Essen" [689] of Belgium. Namur and Charleroi specialise in general hardware, especially wire and nails; and railway plant is a special product at Brussels and Verviers. One of the richest **zinc** districts in the world lies close to the German frontier, Moresnet and Verviers leading in production; and between Verviers and Liège much **copper** and **lead** are mined. Dinant makes various metal wares, the Ardennes forests support an important glass industry (*cf.* §§ 671, 682) on the coal-field at Liège, and suitable clays feed large potteries at Jemappes. Other products are building stones, marble, lime and slate.

713. **Textile industries**, which in Belgium are of ancient descent, follow the iron and steel trades in importance. Flanders, famed in olden days for its woollen cloths, now leads in the manufacture of linen, for which it has greater facilities. Ghent takes the chief place, and Mechlin, Brussels and Bruges specialise in fine lace, for which excellent Dutch flax is used as well as the home product. Courtrai formerly made the finest linens, but now mainly converts coarse Russian flax into cheap material for the Belgian Congo. Large cotton imports supply the mills of Ghent, Courtrai and Tournay, which are again mainly engaged in supplying the Congo market, though producing also considerable quantities of very fine goods. The woollen industry has migrated eastward towards the Ardennes pastures, where wool is increasingly supplemented by Argentine imports; and Verviers is the chief centre, though Brussels still makes carpets. Chemical industries are important at Liège and Jemappes, and

Ghent uses flax, hemp and rape-seed in its oil-mills, and makes artistic furniture (including church furniture) from imported timbers, for which it is the chief market. Sugar-refining and distilling are most important at Antwerp, the latter industry using sugar-beet, potatoes and rye; and much sugar is exported. Other important industrial products are artificial silk (made from wood-pulp), gloves and motor-cars.

714. Communications, Chief Cities and Ports.—Roads are so numerous and excellent that road-traction competes even with the railways, which are focussed chiefly at Brussels and Ghent [Fig. 125]. The “through” French lines to Germany run from Calais *via* Brussels and from Paris *via* Namur. **Brussels** (646,400), the capital, with many industries, is now accessible by large vessels. **Antwerp** (308,618), the second city and chief port, at the head of the tidal estuary of the Scheldt, accommodates 30-foot vessels and rivals Rotterdam in importance. To encourage the transit trade, for which it is so well placed, the Scheldt was made free to all nations in 1863. Antwerp is the world’s chief ivory market, receiving large consignments with rubber from the Congo; and it now rivals the less convenient Amsterdam in the cutting and polishing of diamonds. Deep canals connect it with the Meuse, the Rhine and the Seine. **Liège** (167,676), the third city and chief industrial centre, is the leading horse-market, importing largely to supply the demand for horse-meat. **Ghent** (166,719), the fourth city and also a great industrial centre, may now—since 1908—be reached by canal from Terneuzen by 27-foot vessels. **Bruges**, recently connected with the North Sea by a 26-foot canal, should recover much of its importance lost by the silting of the canal to the

Scheldt estuary; and Zeebrugge has been made a large port. Ostend is an important packet station.

715. The entire foreign trade [Fig. 130] has doubled within ten years, a fact due to industrial development promoted by the endeavours of agents in most foreign lands to widen the export market. The

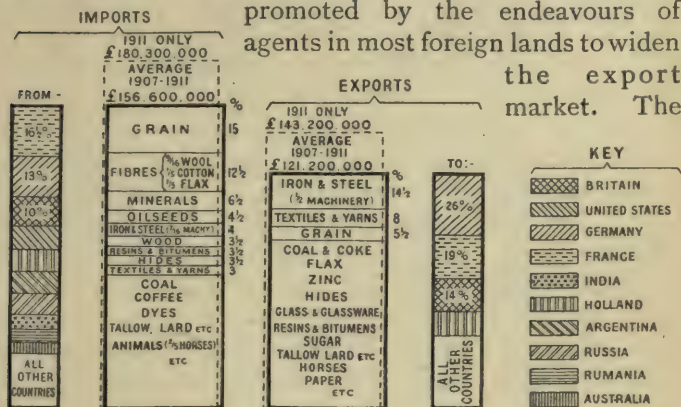


FIG. 130.—BELGIUM: FOREIGN TRADE.

rapid increase of the cotton industry as a result of the opening up of the Congo region is attested by the fact that the raw cotton import for 1911 was almost double that for the previous year; and the raw wool import was similarly more than doubled in 1910.

FRANCE

Area, 207,054 square miles ($=1\frac{2}{3}$ times Britain); population, 1911, 39,601,509 ($=\frac{7}{8}$ Britain).

716. The French birth-rate is almost equalled by the death-rate, the population being therefore practically stationary. The country has the unique advantage of facing both Atlantic and Mediterranean commercial highways; and, offering two important lines of pene-

tration through the central mountain barrier, it has developed a large transit trade. The Rhone valley provides a natural route northward to Dijon, whence the northern plain is reached by the Yonne valley over an easy crossing now followed by both the Burgundy Canal and the Paris-Lyons-Mediterranean Railway [Fig. 125]. The low Garonne-Aude divide between the Pyrenees and the Cevennes offers a shorter route to the less important Biscay coast, followed by the Canal du Midi from Cette to Toulouse, and suggested as suitable for a ship-canal from Bordeaux to Narbonne.

717. The level nature of fully half of the surface north and west of the central highlands facilitates land and water communication; and, although the waterways carry only half the tonnage as compared with those of Germany,¹ they are extremely useful, bearing both light and heavy traffic, and enabling the waterborne tonnage of Paris to exceed that of Marseilles with its enormous transit and general trade. The oceanic climate, abundant rains, and warmth due to latitude alike promote agriculture; and western slopes are clothed with **forests**, supplying the wood used for domestic fuel, but deficient in building timbers, which are therefore a heavy import—mainly from northern Europe. They yield, however, valuable cabinet timbers, supplementing imports of tropical woods for the artistic furniture industries so prominent at Paris and elsewhere.

718. **Agriculture.**—Fully half the surface is arable, and fully half the population lives on small holdings. Wheat is much the largest crop, the area devoted to it being about 50 per cent. greater than that of Canada, and making France the fourth wheat-grower [Fig. 10]; yet large imports are necessary for home consumption,

¹ Despite their somewhat greater extent—8,554 miles [694].

and for use in the alimentary paste industries which convenient imports of hard Italian wheat [241] have made most prominent at Marseilles. Macaroni, vermicelli and a certain amount of flour are practically the only forms in which grain is exported. The chief wheat-lands are in the dry, warm, central valleys of the Seine and Loire basins, particularly in that of the Allier, which is deeply covered with fine, volcanic soil blown down from the Auvergne heights.

719. Oats cover two-thirds, rye one-fifth, and barley one-ninth as much land as wheat, the two last being raised mainly on poorer lands near the coast and on the uplands; and the barley supports many north-eastern breweries where the valleys grow hops successfully. Considerable buckwheat is raised, and maize is grown in the greater heat of the lower Rhone valley, where the mulberry and the olive flourish, the latter supplying the oil-mills of Provence, particularly those of Marseilles, which also consume various imported oil-seeds; and the oils in turn supply the sardine and anchovy-canning, and soap and candle industries of the city. Potatoes, grown mainly in the west, cover one-fourth as much land as wheat, and sugar-beet, grown on the rich north-eastern plain, furnishes raw material for the refineries of Lille, Paris, Marseilles and other ports, which ship sugar—mainly to Britain.

720. Tobacco, a state monopoly, is important, but growing is prohibited where results do not come up to standard. Production is greatest in the warm Garonne valley, Toulouse leading in manufacture. Flax, hemp and colza are grown in the Garonne and Sarthe valleys, and in the north-east near the Belgian frontier, where conditions are ideally suitable [711]; but the demand requires Belgian and Russian imports in addition.

Northern orchards, particularly in Normandy, produce much cider, and market-gardens are prominent in the north-east, whence access to both home and British markets is easy. Chicory is a special north-eastern product from Abbeville to Boulogne (*cf.* § 711).

721. The **vine** is of enormous importance to France, the chief wine-producer; and wine is almost naturally the national drink. The industry suffered seriously towards the end of last century from the ravages of the phylloxera, an animal pest that ruins the vine on which it feeds; and enormous imports of cheap Algerian and Italian wines became necessary to mix with the home product and even to be re-exported as French (*cf.* also currants, § 232). Though the trouble has now been practically surmounted, the imports still to a large extent continue. The dry, warm valley slopes of Champagne, Burgundy and Guyenne produce the many well-known brands for which the country is famed. Cognac, in Charente, is famed for its brandies. The Loire valley produces inferior brands, and considerable quantities are produced on the south coast.

722. **Stock-raising** is of great importance, France rearing more than twice as many cattle, horses and sheep as Britain. Cattle are fed in all parts of the plain, both for meat and milk, dairy products being prominent in Normandy, where the best butter and cheese are made and sent to both Paris and London, the cheeses of Camembert and Neufchâtel being of special repute. Brie, in the north-east, also makes an excellent cheese; while that of Roquefort, in the upper Garonne valley, is made from ewes' milk. Excellent draft-horses, mules and asses are raised in the south-west, and pigs are fed in the forests and on maize. Sheep pastures are slowly shrinking with the

gradual extension of wheat-lands, but the country still possesses two-thirds as many sheep as Britain, and the wool, especially of the Ardennes and Cevennes pastures, is exceedingly fine. The dry, warm climate and abundance of grain promote poultry-rearing, and chickens and eggs are largely exported to London.

723. **Fisheries** are important, though the output is only about one-fifth that of British fisheries. Cod, from the fishing-grounds of Iceland, Newfoundland, the Grand Banks and the North Sea, is the chief product, sardines from the Biscay and Mediterranean shores coming second, followed by herring from the North Sea and mackerel from the Biscay coast; the "catch" also includes Mediterranean tunny-fish and anchovies, and "cultivated" lobsters and oysters from sheltered western estuaries (*cf.* § 548).

724. **Minerals.**—The chief **coal**-field is the north-eastern, which extends through Belgium into Germany and yields about three-fourths of the total output. Anzin is the chief centre, Lens, Denain, and Valenciennes also contributing. Coal elsewhere, though widely distributed, nowhere covers large areas, the mines of Le Creuzot, St. Étienne and Alais alone being important. The total production is insufficient for the demand, one-third of which is met by imported supplies from Britain, Belgium, and Germany. The only coal-field near which **iron** is also found is that of Le Creuzot, which has therefore been able to develop the greatest and most varied iron and steel industries (*cf.* §§ 689, 712), covering practically every branch of production from smelting and steel-making to the manufacture of an infinite variety of finished goods including steel rails, machinery, locomotives, small-arms and cannon, as well as shot from local lead.

Nine-tenths of the iron output, however, is mined in the rich upper Moselle field. Nancy is the chief centre, using German coal—brought by river and canal from the Ruhr valley [686].

725. Lille, with its suburb, Fives, has a large industry on the north-eastern coal-field, particularly in locomotives and machinery, for which Belgian ore is used. Imported Algerian and Sardinian ores supply the industries of Marseilles and St. Étienne and the electric smelting-works of Grenoble, Marseilles drawing convenient coal from St. Étienne; while fine Spanish ore is used in the industries of Bordeaux. Local deposits of grinding-stone explain the cutlery industry of Langres, in the upper Marne valley. Ship-building is important at all the chief ports. Most of the **salt** is obtained from brine-marshes on the west and south coasts, but the rock-salt deposits of Nancy contribute substantially. Phosphoric chalk is an important product of the Somme valley, and other mineral products include sulphur from the volcanic heights of Auvergne, which supports the match industry so profitably monopolised by the State; lead, silver, zinc, antimony, arsenic, building-stones, slate, and cement.

726. **Industries.**—**Iron and steel** industries, and certain of those dependent upon agriculture, have already been mentioned. One of the most notable characteristics of French industry is its diffusion throughout the country, owing to the wide distribution of coal; but its chief characteristic is undoubtedly the fineness and artistic nature of most products, which, by their quality, command a market nearly everywhere in spite of their costliness. This is particularly true of products of the various **textile trades**. The juxtaposition of the great north-eastern coal-field, Franco-

Belgian flax-fields, and Ardennes pastures has there concentrated textile industries, to which even cotton has been attracted from America *via* Dunkirk, and from Egypt *via* Marseilles.

727. The **woollen** industry stands easily first. Home-grown wool is particularly fine, but three-fourths of the fibre demanded by the mills is imported—mainly from Argentina and Australia, and the growing industry and shrinking pastures cause a steady rise in the import. Roubaix and Turcoing lead in the manufacture of cloths; Reims and Sedan, with Paris and Lyons (near the Cevennes pastures), specialise in shawls, and Troyes in hosiery; carpets are most largely made at Roubaix, Turcoing, Croix, Paris and Beauvais; tapestry, at Beauvais and Elbeuf; and fine flannel and woollen cloths at Elbeuf and Louviers. Billiard-cloth is a speciality at Elbeuf. Amiens is a great wool-market and manufacturing centre, being equally convenient for imports through Dunkirk and Rouen.

728. Most of the raw **cotton** imported comes from America, chiefly to Havre, but increasingly to Dunkirk. Rouen, convenient for English coal imports, leads in the manufacture, Lille being the chief "Dunkirk" centre. Amiens, through its convenient situation, has developed a large industry; and Roubaix, Turcoing, St. Quentin, and other towns on the north-eastern coal-field also take a prominent part. Raw cotton from Egypt and India naturally comes to Marseilles, feeding the mills of Lyons, St. Étienne, and other Rhone towns. The chief **linen** industries are naturally in the flax country, to which additional fibre is easily brought over the frontier from Belgium, or through Dunkirk from Russia; Lille, Roubaix, Valenciennes, and Cambrai are the chief centres. Fine lace is a

special product at many towns in this district, Valenciennes giving its name to a particular variety; and cambric owes its name to Cambrai.

729. **Silk** is a distinctive industry of the Rhone valley, where, however, the culture of the silk-worm has suffered so greatly from disease and competition with Chinese, Japanese and Italian supplies that all but one-tenth of the raw silk consumed is now imported. Lyons is the largest silk-market, and possesses the greatest and most varied silk industry in Europe, and St. Étienne follows—producing mainly ribbons; both towns have the advantage of plentiful supplies of water suitable for dyeing. Nîmes and Avignon specialise in lighter fabrics, Paris in gauzes and tulles, Calais in tulles, and Tours in hosiery. Exports of silk goods have declined considerably owing to the development of the industry in other lands, particularly in America.

730. Cattle and sheep pastures furnish hides and skins for tanning, and the chief **leather** industries are found where imported supplies are conveniently obtained through Havre, Bordeaux, or Marseilles; thus Paris is famed for shoes and kid gloves, Toulouse for boots and shoes, and Marseilles for shoes, kid gloves and morocco leather (from North African goat-skins); while Grenoble is the centre of a great glove industry drawing goat-skins from the Alpine pastures behind. Porcelain industries utilise suitable clays at St. Cloud, a suburb of Paris where “Sèvres” ware is now made, and at Limoges. The glass industry of St. Étienne specialises in bottles for the great wine regions for which it is centrally placed, Paris and Baccarat being famed for cut-glass ware. Electrical industries, especially the making of motors, are prominent at Lyons and Clermont-Ferrand in the Allier valley; there is an important

watch industry at Besançon (*cf.* Geneva, § 677); and Paris has many varied industries producing artistic metal-wares, jewellery, confectionery and perfumes, the last being also largely made at Marseilles and applied to the manufacture of toilet soap (*cf.* § 719). Paper is made from fibre waste at Angoulême and Annonay.

731. Communications.—The canals of the industrial north-east are particularly extensive, the Somme, Oise, Sambre, and Meuse being all inter-connected. Other important connecting canals are shown in Fig. 125. Steamers reach Paris from London by the Seine, smaller craft ascending to Troyes; the Loire is navigable to Nevers, and the Garonne to Toulouse. The Rhone becomes navigable only above Lyons. The railway system is exceptionally simple [Fig. 125], the unnecessary duplication of competing lines having been largely avoided; and the great main lines radiate in all directions from Paris.

732. Chief Cities and Ports.—**Paris** (2,888,110), the capital, stands on the navigable Seine in the middle of the northern plain, over which must pass all the overland transit trade *via* Marseilles between the Mediterranean, on the one side, and Britain and America on the other, as well as a large share of that between America and central Europe *via* Havre. It commands all the railways, and has a greater variety of fine and artistic industries than any other city. **Marseilles** (550,619), the second city and chief port, has an enormous import trade in grain, silk, cotton, coffee, oils and oil-seeds; and its chief industries are connected with these—*e.g.*, oil, soap and flour-milling. **Lyons** (523,796), the great silk centre, is the third city.

733. Bordeaux (261,678), the fourth city and third port, handles most of the wine export. **Lille**, the fifth

ever, has been lost to **St. Nazaire**. **Cette**, which requires constant dredging to prevent silting by a westward-flowing current [175], has a large wine import trade. Dieppe, Boulogne and Calais have a considerable trade with North Sea ports, as well as an important passenger trade with Britain; and Cherbourg, Brest and Toulon are great naval ports.

734. Much of the **foreign trade** [Fig. 131] is, as already mentioned, of a transit nature.

QUESTIONS

109. Account for the industrial and commercial predominance of Europe.

110. Why is Moscow 8° hotter than Glasgow in July, and 25° colder in January?

111. Why are German rivers so much more useful than Russian?

112. The exports of Petrograd are less than half those of Odessa, while the imports are double. Why?

113. What is the "magnetic" process of working iron ore?

114. Account for the importance of Moscow, Vienna, Berlin, Emden, Copenhagen, Rotterdam, Antwerp, Paris, Marseilles.

115. On a blank map of Europe mark the chief regions raising (a) wheat, (b) sugar-beet, (c) flax, (d) dairy products.

116. Germany's development has been rapid, that of Austria-Hungary slow. Explain carefully why.

117. On a blank map mark the chief European coal-fields.

118. Describe Swiss industry briefly, in general terms.

119. Name the three greatest Continental iron and steel towns, accounting for their prominence.

120. Explain the commercial importance of Holland.

CHAPTER XI

THE UNITED KINGDOM

Division.				Area.	Population (1911).
England	...	...	...	50,890 sq. miles.	34,045,290
Wales	...	...	...	7,434 "	2,025,202
Scotland	...	...	...	30,405 "	4,759,445
Ireland	...	...	...	32,360 "	4,390,219
Other parts	...	...	...	297 "	148,934
Total				121,386 sq. miles.	45,369,090

735. STATISTICS of the foreign trade of Britain [Fig. 132] reveal two salient facts: (a) that the imports greatly exceed the exports; and (b) that the former consist mainly of food and raw materials, and the latter mainly of manufactured goods. In view of the large entrepôt trade [738], however, it is wise to consider not only the total or "*general*" foreign trade of the country, but the "*special*" foreign trade, *i.e.*, the proportion of imports retained for consumption in the country, and of exports furnished by goods produced in the country. This "*special*" foreign trade of Britain is shown in two aspects in Figs. 133 and 134, which are found to retain the main characteristics of Fig. 132.

736. The consistent excess of British imports over exports is only apparent, for there are "**invisible**" **exports** which serve to balance the account, *e.g.*, the

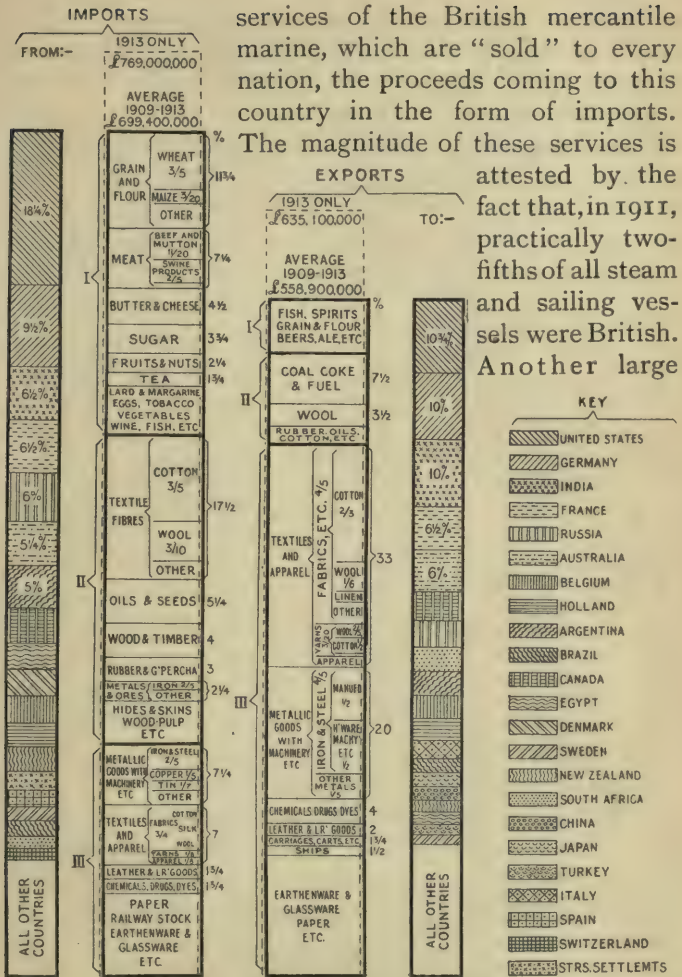


FIG. 132.—UNITED KINGDOM: FOREIGN TRADE.

I. Food, drink and tobacco.

II. Raw materials and articles mainly unmanufactured.

III. Articles wholly or mainly manufactured.

“invisible” export is the services rendered to nearly every land by British capital investments, the annual interest or dividends again coming to Britain in the shape of imports.

737. Originally forested [641], Britain gradually became essentially pastoral and agricultural, the staple export—and still the chief agricultural export—being wool. The increasing cost of agriculture through soil-exhaustion and rising rents, however, led to its decline

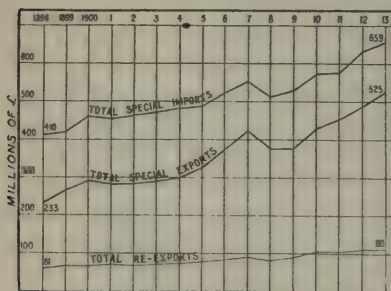


FIG. 133.—UNITED KINGDOM: GROWTH OF FOREIGN TRADE.

in competition with new lands; and this, with the development of industry, has made Britain essentially industrial, and dependent for the bulk of her food-supply upon other lands. Her continued industrial growth, despite the serious competition of other countries,

is well shown by Fig. 134, raw materials showing the chief rise among imports (almost 90 per cent.) and manufactured goods among exports (110 per cent.).

738. The **commercial predominance** of Britain is the direct outcome of her central position amid the land masses of the earth, Empire as well as foreign produce gravitating towards Britain—mainly London—whence the proportion not required for home consumption was conveniently redistributed to the great consuming lands of Europe and North America. The share of Empire lands in British foreign trade is shown in Fig. 135.

739. The advantages of centrality have been emphasised by **topography**. The central and south-eastern English plains, the most productive part of the country, are crossed by useful rivers whose estuaries widen towards the great markets of central Europe; while western estuaries similarly face great trading ports across the Atlantic, which is here at its narrowest, Liverpool thus securing a large share of the entrepôt trade in its relation to the New World. Owing to the narrowness of the country, moreover, no great centre is more than fifty miles from a port; and this compensates for comparatively high railway rates due mainly to the impossibility, in a small country, of large-scale organisation of traffic (*cf.* the United States).

740. The English plains contain successive layers of sedimentary rock—chalk, sandstone, clay and limestone; and the upfolding of the land was followed by “weathering” of the heights, and the exposure of the edges of underlying layers [Fig. 6]. Thus across the plains runs a series of chalk, sandstone and limestone ridges, separated by clayey plains [Fig. 136]. Such porous heights or “downs” grow little but poor grass, and are thus among the chief sources of wool [19]; while the stiff soil of the plains is ideal for wheat, except where its lowness

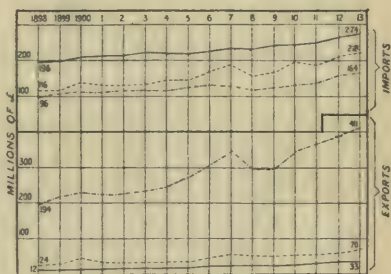


FIG. 134.—UNITED KINGDOM: CLASSIFICATION OF SPECIAL FOREIGN TRADE.

- Food, drink and tobacco.
- Raw materials and articles mainly unmanufactured.
- · - · - Articles wholly or mainly manufactured.

renders it so moist that rich grass for dairy cattle is the natural growth. North-west of this series of elevations the Midland plain is mainly clay or sandstone, and largely pastoral, with frequent woods; the Lancashire and Cheshire plains, in the moist climate [758], are mainly rich meadow-land.

The north-eastern plains are agricultural, and are edged seaward by a double line of limestone and chalk heights.

741. The Pennine elevation, separated from the pastoral Cumbrian heights by the deep Eden valley, is sufficiently low to enable three canals and several railways to cross it, the Aire gap, in the middle, and the Tyne gap, in the north, being the chief routes: and the exposure, by denudation, of coal-seams in many of the valleys laid the foundation of modern England's industrial greatness. The southern Scottish uplands—broad, barren and pastoral—contain fertile and well-wooded valleys; and north of them lies the fifty-mile-wide rift valley, running from south-

west to north-east [Fig. 136], which separates them from the Scottish highlands, and in which the agricultural, industrial, and commercial life of the country is

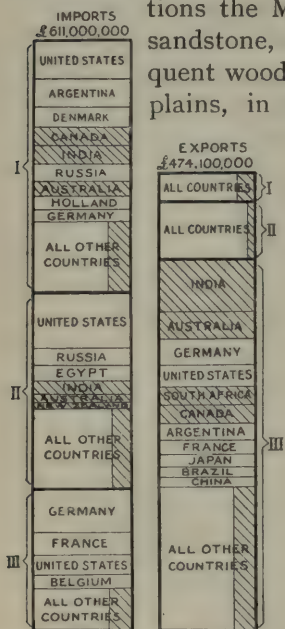


FIG. 135.—UNITED KINGDOM: SPECIAL FOREIGN TRADE (CLASSIFIED AVERAGES, 1910-1913 INCLUSIVE).

Shaded sections=British Empire lands.

- I. Food, drink and tobacco.
- II. Raw material and articles mainly unmanufactured.
- III. Articles wholly or mainly manufactured.

concentrated [Fig. 137]. The Irish mountains, mainly near the coast, enclose a great central plain, much of it low and marshy bogland, rich in peat; but the plain extends to the Irish Sea through a wide, fertile, and productive gap in the highland edge, where Dublin (304,802), reached by the short mail route from Holyhead to Kingstown, enjoys easy communication inland, and is the natural political capital. The moist climate of most of the country favours pasture, dairying and stock-raising, rather than agriculture. The possibilities of peat have been mentioned elsewhere [44].

742. Climate. — The distribution of the highlands [Fig. 138] determines that of the rainfall

obtained from the prevailing south-west Anti-Trades [Fig. 139]. These winds, aided by the warm drift [Fig. 3], make the climate essentially oceanic, but the intervention of hills and exposure to cold east winds impart to the eastern climate a distinctly "continental" tinge [Fig. 140].



FIG. 136.—GREAT BRITAIN: COAL-FIELDS AND NATURAL DIVISIONS.

743. The home production of useful timbers is small compared with the import. Oak and beech characterise English and Irish lowlands and sheltered Scottish valleys, *e.g.*, the chair industry of High Wycombe draws beech supplies from the Chilterns. Elm and ash are found in most parts, and the birch and the Scotch fir are typical of the harder northern climate.



FIG. 137.—SCOTLAND AND IRELAND: DISTRIBUTION OF POPULATION.

744. **Agriculture** in Britain engages some 56 per 1,000 of the population, or little more than half the proportion in Belgium, one-third of that in Germany, and one-fourth of that in France. The arable area is at present less than one-fifth of the total [Fig. 141], most of it occurring on the English plains, and the largest proportion is devoted to clover and other grasses [Fig. 142]. The chief grain crop is oats, particularly in cooler Scotland and moister Ireland. The wheat crop is not large [Fig. 10], and the high average



FIG. 138.—UNITED KINGDOM: RELIEF AND MAIN RAILWAYS.

yield is obtained by the intensive cultivation of only the best land—i.e., mainly in the dry, warm eastern counties of England [Fig. 143]. The finest grain is

grown on the clay lands of the Thames basin and round the Wash. Twenty years ago one-third of the country's requirement was home-grown, but the proportion is now only one-fifth. The chief sources of the huge import are shown in Fig. 144, the Empire now furnishing almost half.



FIG. 139.—UNITED KINGDOM: ANNUAL RAINFALL.

745. Barley thrives best in the mixed clay and chalk lands of the English Midlands, and

in the eastern Scottish and Irish lowlands; and, though widely grown, its superior quality in these regions explains the high reputation enjoyed by the beers of Burton-on-Trent (where the local water is peculiarly suitable), London, Edinburgh and Dublin, and the

whiskies of Scotland and Ireland. The finest turnips are raised in Banffshire, and in Norfolk and Suffolk. The potato crop is heavy, especially in Ireland, where it furnishes the staple peasant food, Germany alone rivalling her in production per head of the population [684]. Peas and beans flourish particularly in Lincolnshire, Suffolk and Essex. The sugar-beet, quite a new



FIG. 140.—UNITED KINGDOM: ISOTHERMS.

crop in Norfolk, should succeed there and in other parts of the country.

746. Hops are of special importance in Kent, Surrey, Essex, Worcestershire and Herefordshire. The finest apples and pears are grown in the mild Severn valley, whence the cider of Devonshire and Herefordshire, and the perry of Worcestershire. The plums, cherries and other fruits of the warm south-eastern English counties—notably Kent—are famed, supporting the great jam

industries of the capital, as the strawberries and other fruits of the Carse of Gowrie and the northern slopes

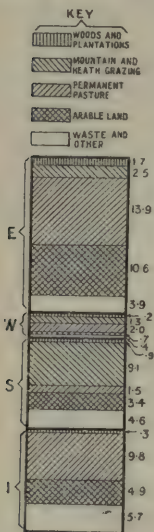


FIG. 141. — UNITED KINGDOM: DISTRIBUTION OF SURFACE IN 1911, IN MILLIONS OF ACRES.

E = England.
W = Wales.
S = Scotland.
I = Ireland.

of Strathmore supply the jam-works of Dundee. Flax is an almost exclusively Irish crop [111], now furnishing but one-ninth of the home demand, but it has lately begun once more to increase.

Market gardens, found round most large cities, are specially prominent in the counties around London, and in the

Channel and Scilly Islands, whose mild climate enables them to specialise in early varieties. Mustard is widely grown on the reclaimed polders [703] of the "Fens."

GREAT BRITAIN 14,300,000 ACRES	
CLOVER & GRASSES	4.0
OATS	2.9 (111.0)
WHEAT	1.8 (55.4)
BARLEY	1.8 (57.9)
TURNIPS & SWEDES	1.5
POTATOES	.6
ALL OTHER CROPS	1.7

FIG. 142. — UNITED KINGDOM: ARABLE AREA DEVOTED TO EACH LEADING CROP IN 1913, IN MILLIONS OF ACRES.

(Grain crops shown in brackets in millions of bushels.)

IRELAND 5,000,000 ACRES	
CLOVER & GRASSES	2.6
OATS	1.1 (54.2)
POTATOES	.6
ALL OTHER CROPS	.7

747. Stock-Rearing. —

Sheep are reared in most parts [Fig. 145], the number in proportion to the population being higher than

in any other "sheep" country except Australia, South Africa and the Plate region. The finest wool is obtained on the moors and downs of England, and on the northern English and southern Scottish uplands; while the wetter highlands of Scotland and Wales produce the finest mutton. Sussex and Hampshire, however, also produce very fine mutton ("South Down"). Very fine wool is obtained in Shetland.

748. Cattle are raised mainly on the richer grazings of the lower and milder parts of the country [Fig. 145], hence the large share of the total number (five-twelfths) falling to Ireland [Fig. 146]. The entire milk-yield, however, is far below the demand, and, while an excess in some parts enables butter and cheese to be prominent products, the shortage in other parts—particularly

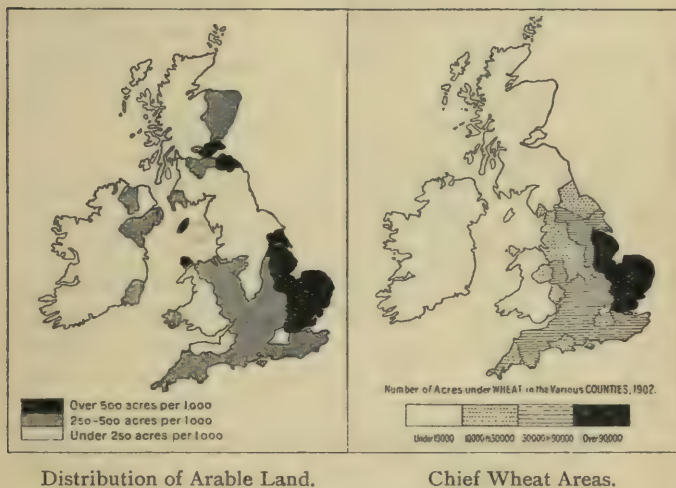


FIG. 143.—UNITED KINGDOM: CULTIVATION.

round some of the large cities—is lamentable. The finest cream and butter are produced in the counties of Chester, Salop, Buckingham, Dorset and Devon; in the Channel Islands; in the rich valleys of the Clyde-Solway peninsula; and on rich Irish grazings. The mixed clay and lime soils of Somerset, Gloucester, Huntingdon, Leicester and Northampton explain the fineness of the cheeses made in those counties, and notably at Cheddar and Melton Mowbray; and the

less rich grazings of Aberdeen, Caithness and Durham account for the fine meat of those counties.

749. Most of the horses raised are for draught use, and those of Yorkshire and Clydesdale are the finest in the world; in Ireland magnificent hunters are bred in large numbers. The sturdy little ponies of Shetland are noted. Swine-rearing is common everywhere, especially in Ireland [Fig. 146]. The bacon of Wilt-

shire and Berkshire, and the hams of Cumberland, Westmoreland, Yorkshire and Belfast, are famed. Poultry are reared with particular success in Buckingham, notably at Aylesbury; but the production of both eggs and chickens is utterly inadequate, and huge imports are therefore necessary.

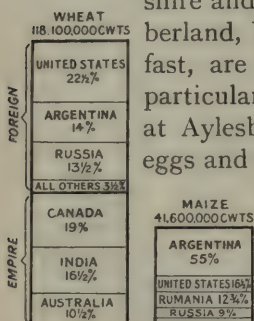


FIG. 144. — UNITED KINGDOM: WHEAT AND MAIZE IMPORTS (AVERAGES, 1909-1913 INCLUSIVE).

750. The British fisheries are the richest in the world (*cf.* §§ 522, 548), drawing an enormous annual harvest from the North Sea Banks [155]. Of the entire "catch," herring, cod and haddock together account for three-fourths in

volume, and over three-fifths in value [Fig. 147]. Herring alone represents half of the total in weight and one-third in value. Scotland, with but one-ninth of the total population, furnishes one-third of the output; the Irish share is comparatively small.

751. Flat-fish come mainly from the Dogger Bank, and mackerel from the English Channel; oysters are obtained in sheltered inlets at Whitstable and Colchester. Grimsby, receiving one-third of the entire "catch," is the largest fishing port in the world; while the enormous metropolitan population and splendid

services of trains and fast trawlers have made Billingsgate the largest fish-market in the world. Hull, Lowestoft and Yarmouth, all convenient—like Grimsby—for rapid distribution to populous inland centres, are also great fishing ports, as are Wick, Peterhead and Aberdeen (163,891) in Scotland, the last lying at the

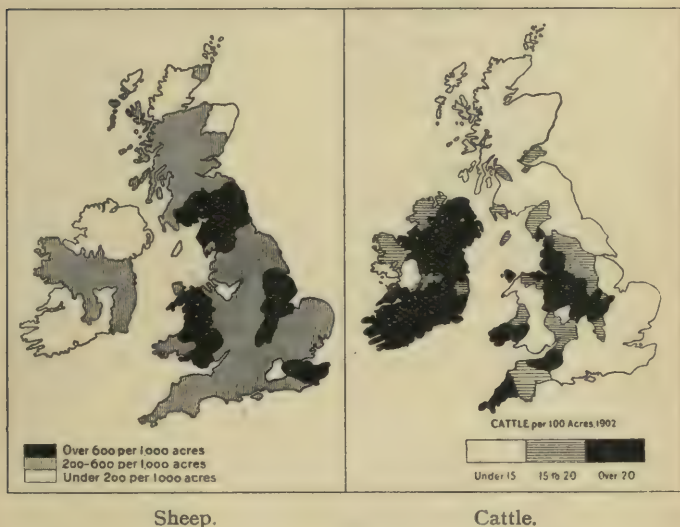


FIG. 145.—UNITED KINGDOM : DISTRIBUTION OF SHEEP AND CATTLE.

junction of two valleys on the eastern plain, opposite the Great Fishing Bank ; and all benefit by convenient ice-imports from Norway. In the more remote Scottish ports the necessity for preservation has developed great curing industries, and the ease with which salt and barrels are imported from the Continent has made salt herring the most important Scottish product—particularly for export.

752. **Mining** engages some 22 per 1,000 of the

population, or 50 per cent. higher than the proportion in Germany, and about thrice that in the United States. In Belgium, however, the proportion is higher—30 per 1,000. **Coal** is much the most important mineral product [158], the British output being

exceeded only by that of the United States [Figs. 31 and 32]; and the convenience of Britain for foreign markets has made her the outstanding exporter [Fig. 33], over one-fifth of her output being exported. The distribution of the chief coal-fields is shown in Fig. 136; the product of the few small Irish fields, remote from the sea, *e.g.* in Kilkenny, is inferior and comparatively unimportant. The Pennine fields of England account for practically half of the entire output [Fig. 148]; Glamorgan

and Lanark produce most of the rest—the former raising mainly fine steam-coal, two-thirds of which is exported from Cardiff—easily the greatest coal-exporting port in the world.

Newport and Swansea also ship vast quantities. Newcastle's coal export (bituminous) is about half as large as that of Cardiff, mainly to London for household and industrial use; and large quantities are also exported from Hull,

Blyth, Sunderland, Grimsby, Glasgow,

Port Talbot, Methil, Burntisland, Grangemouth and Leith. France and Italy are the chief purchasers, followed by Germany, Argentina, Spain and Sweden. Ayr, Ardrossan, Troon and Irvine ship coal to Irish ports.

753. Britain follows the United States and Germany as a producer of **iron** [Fig. 34], the Cleveland, Furness and Lancashire fields being the chief. **Stone** (including marble and slate) follows iron in impor-

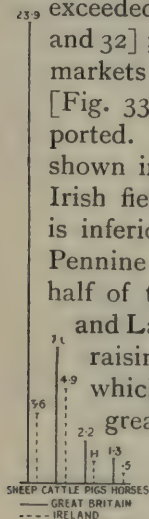


FIG. 146.—UNITED KINGDOM: LIVE STOCK IN 1913, (IN MILLIONS).

tance. The marble comes mainly from Devon, Derby and Kilkenny, and Aberdeen, Leicester and Carnarvon lead as granite sources. Carnarvon produces the best slate, and the best building-stone is obtained in Dorset, Somerset and Kirkcudbright.

754. The only other minerals of importance are brick-clay, which abounds everywhere, but notably in Middlesex and Salop; fire-clay, obtained at Stourbridge; china-clay, in the Tamar valley in Cornwall; tin, in Devon and Cornwall; oil-shale, mainly in Linlithgow, Midlothian and Fife; salt, in Cheshire, round Middlesborough, and at Carrickfergus, near Belfast; lead, in Derby, Cumberland, Durham, Westmoreland, Dumfries, Flint, Man and Wicklow; chalk, in Kent; and zinc, in Cumberland, Flint, Denbigh, Cardigan and Man. Copper is found in Glamorgan, Devon, Cork and Wicklow, manganese in Cork, plumbago in Cumberland, gypsum in Stafford, and cement in Kent and Essex.

755. **Industries.**—The textile trades are much the most important, and **cotton** stands easily first, engaging almost half of the textile workers. It is emphatically a Lancashire industry, 80 per cent. of the hands employed being found in that county, with its usefully humid air, its abundant supply of pure water, its rich coal-field, and convenient imports of raw material through Liverpool and Manchester, three-fourths of the enormous import coming from the United States

TOTAL 24.7 (14.2)
HERRING 12.2 (4.6)
COD 3.9 (2.3)
HADDOCK 2.3 (1.9)
WHITING 7. (4)
HAKE 6. (7)
MACKEREL 6. (2)
SKATE & RAY 5. (2)
LING 4. (2)
ALL OTHERS 3.5 (3.7)

FIG. 147.—UNITED KINGDOM — SEA FISHERIES: FISH LANDED IN 1913, IN MILLIONS OF CWTs. (Values shown in brackets in millions of £.)

[Fig. 149]. The efforts of the British Cotton-Growing Association to obviate dependence upon a single source have been already dealt with [107-8].

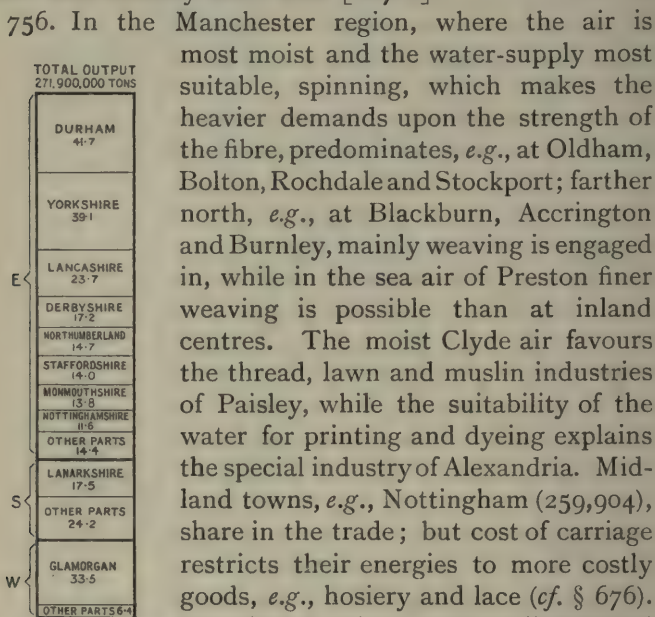


FIG. 148.—UNITED KINGDOM: COAL OUTPUT FOR 1911, IN MILLIONS OF TONS.

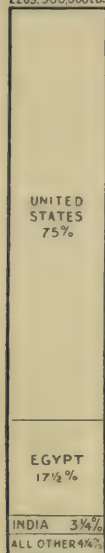
E=England.
S=Scotland.
W=Wales.

has been largely confined by climatic conditions to coarser and cheaper products, so that Lancashire has maintained its predominance by specialisation in finer products.

757. The **woollen** trade, employing about half as

many hands as the cotton trade, is mainly centred in Yorkshire, where almost three-fourths of the workers are found. The demands of the industry require an import of wool thrice as large as the home output [Fig. 132],

COTTON
2269,900,000LBS



three-fifths of it being derived from Australasia [Fig. 149]. Leeds (445,550), the seventh city, rich in coal and water-power, and commanding routes over the Pennines, is the chief centre, with a great variety of manufactures, among which ready-made clothing is an increasingly important line; and, like Manchester, it is the chief receiving and distributing centre. Bradford (288,458), with excellent dyeing water, manufactures mainly

WOOL
805,800,000LBS
40% RE EXPORTED



worsted, alpaca and mohair; Halifax specialises in flannels, blankets and carpets; Huddersfield, in broadcloth; Rochdale (Lancashire), in blankets; and Batley and Dewsbury, in "shoddy"—from "waste."

FIG. 149. — UNITED KINGDOM : COTTON AND WOOL IMPORTS (AVERAGES, 1909-1913 INCLUSIVE).

758. The "Cotswold" sheep supplies the mills of the Severn valley with fibre, pure dyeing water and excellent coal also favouring the industry. Stroud and Bradford are the main centres, a special

line at the former being scarlet cloth for military uniforms; Welshpool makes flannel, and Kidderminster, carpets. The "Cheviot" sheep furnishes material for the industry of Roxburghshire, where the water is again eminently suitable, Hawick and Galashiels leading in the output of "cheviots" and "tweeds." Carpets are made at Kilmarnock and Ayr, and hosiery at inland

Leicester (227,222) and Dumfries (*cf.* Nottingham). Hand-made "tweeds" are woven in the Hebrides and Connaught.

759. **Linen** is a distinctly Irish industry, local flax, convenient coal-imports from Ayr, Cumberland and Lancashire, a desirably moist climate and abundance of suitable water for bleaching and dyeing specially favouring its development in Ulster, where the finest work in the country is produced, *e.g.*, lawn, cambric and lace. Belfast is the chief centre of the industry, and Newtownards, Lisburn, Lurgan, Ballymena, Londonderry and many other towns take a prominent part. Convenient imports of Russian and specially fine Belgian fibres compensate for inadequate home production. Some flax is grown in Yorkshire, where, at Barnsley, local coal, good water and foreign fibre imports have also encouraged an industry. Abundant coal, an insular climate and cheap Baltic imports explain the industry of Fife and Forfar coast towns, Dundee, Arbroath and Montrose, *e.g.*, specialising in canvas and sail-cloth, and moister Dunfermline in table-linen. Other ports, *e.g.*, Sunderland and Stockton, also make sail-cloth. Kirkcaldy, importing both fibre and linseed, specialises in linoleum.

760. **Jute** sacking, carpets, etc., are an altogether special product at Dundee (162,982) since the days of the Crimean War, when Russian hemp-imports ceased and jute was brought as a substitute from Calcutta. Aberdeen shares in the output of jute carpets. Hemp cordage, etc., is largely made at Dundee, Arbroath, and Montrose. Rope is made at most ports, especially those convenient for the Baltic, *e.g.*, Sunderland and Hartlepool; while fishing requirements explain the net industry of Yarmouth.

761. **Silk**, through foreign competition—especially from Germany and Switzerland—is now comparatively unimportant, and is mainly found where suitable dyeing water abounds round the southern extremities of the Pennine coal-fields in Derby, Stafford and Cheshire—*e.g.*, at Derby, Ilkeston, Chesterfield, Macclesfield, Congleton and Leek, the last, through the exceptional purity of the dyeing water, making a speciality of silk thread. The ribbon trade of Coventry has suffered particularly from Swiss competition. Plush, made from imported “waste,” is an important product, silk plush (for hats) being made in Leicestershire, and velvet plush at Bradford, in Yorkshire. Silk is also made in the Kennet valley in Berkshire, and at Braintree, in Essex. Spitalfields and Bethnal Green now largely confine their energies to umbrella silk. Poplin is a special Dublin product.

762. The **iron and steel** trades follow textiles in importance. The home production of ore and of raw iron and steel have already been dealt with [164-7]. The Middlesborough region is distinctly the chief smelting centre, low-grade local ore being now used by a new process, as well as large imports of fine Swedish ore [648]. Smelting is also prominent in the West Riding of Yorkshire, especially at Rotherham and Sheffield; in Staffordshire (the “Black Country”); at Newport (Monmouthshire); round Merthyr Tydvil and Rhondda; at Barrow, Workington, Airdrie, Coatbridge and Falkirk; and in Ayrshire. Fine imported Spanish ore [260] is largely used in the furnaces of the Clyde, Furness, and South Wales.

763. Middlesborough, with its command of railways through Northallerton and Darlington, has the largest output of steel rails; Barrow similarly makes

large quantities, while the output of Sheffield, a great central railway focus, is also enormous. Convenient metal and command of railways has made the building of locomotives important at many centres, *e.g.*, Darlington, Doncaster, Derby, Crewe, Birmingham, Wolverhampton, Swindon, Gloucester, Bristol, Airdrie, Coatbridge, Motherwell and Hamilton. Railway carriages and waggons are also made at most of these "engine" towns, and at Manchester, Newcastle, Eastleigh, Oswestry, Glasgow and Kilmarnock.

764. The most highly organised and prosperous branch of the iron and steel trades is that of **ship-building** (*cf.* § 736), which flourishes wherever suitable estuaries penetrate coal and iron regions. One-third of the entire output is constructed on the Clyde, and great yards exist at Newcastle, North and South Shields, Sunderland, Middlesbrough and the Hartlepoons; also at certain other ports to which coal or iron (or both) are cheaply carried, *e.g.*, Hull, Southampton, Liverpool, Barrow and Belfast, the last having the advantage of the presence of the linen mills, which provide employment for the wives and daughters of the men. There are large Government dockyards at Chatham, Sheerness, Portsmouth (231,141), Devonport, Pembroke, Haulbowline (Cork) and Rosyth.

765. The discovery of millstone grit led to the vast cutlery industry of Sheffield (454,632), the sixth city, where, as at Wednesbury, edged tools are also largely made. Cannon and heavy armour-plate are a special feature at Newcastle, while Barrow also makes guns, and Sheffield, ships' plates and lighter armour. Tinplate is a special product of South Wales, notably at Newport, Merthyr Tydvil, Swansea and Cardiff, facilitated by imports of palm-oil, used as a flux.

766. At inland centres manufactures represent considerable value for a small weight (*cf.* § 676). Thus Birmingham specialises in such articles as small-arms, cycles, screws, nails, pens, pins, needles, and springs. Similar products also characterise surrounding towns, *e.g.*, Wolverhampton, Walsall, Wednesbury, West Bromwich and Dudley. Other special lines include the brass-ware, needles and fish-hooks of Redditch, the enamelled-ware of Bilston, the keys of Wednesbury, the locks and saddlers' ironmongery of Walsall, the nails and chains of Cradley Heath, and the iron-wire of Warrington. "Cotton" machinery is a special Lancashire product at Manchester, Salford, Oldham, Bolton, Rochdale, Bury and Accrington; and "woollen" machinery is similarly made in Yorkshire, notably at Leeds and Bradford. Keighley makes "worsted" machinery. Agricultural machinery is largely made near the English wheat-fields, *e.g.*, at Lincoln, Grantham, Gainsborough and Norwich. Birmingham and Coventry—more especially the latter—lead in the output of cycles, and, more recently, motor vehicles. The copper of Glamorgan is smelted at Swansea, Neath and Aberavon, and brass is worked at Newport; but brass and bronze are most largely made and rolled at Birmingham and Rotherham.

767. **Chemical industries** follow iron and steel. The main factors favouring them are cheap coal and salt. Aniline dyes are important in densely-populated coal regions. Alkali is made in large quantities at Widnes, Newcastle and Glasgow, and Middlesborough and Cheshire salt-fields support great glass industries at Newcastle, at St. Helens and in the "Black Country," particularly at Stourbridge. Worcester uses local salt in glazing pottery. Suitable "earths" in the upper

Trent valley led to the growth of the "Potteries," and the exhaustion of local supplies is now made good by clay imports—by sea, river and canal—from Cornwall. The chief china and earthenware towns are Burslem, Stoke (234,534), Hanley, Newcastle-under-Lyme, Etruria, Derby and Worcester. Stourbridge and London make stone-ware.

768. **Other Industries.**—Where imported oil comes near coal, as at Glasgow, Birkenhead and London, soap is important (*cf.* Port Sunlight). Pulp and esparto grass, imported through London, support the paper-mills of Hertford, Buckingham and Kent (*e.g.*, Maidstone), Norwegian wood-pulp similarly feeding mills round Edinburgh (317,459), *e.g.*, at Penicuik, and near Aberdeen; and convenient textile waste explains the mills of Darwen and Bacup. In all cases the purity of the local water is an important factor. Various ports with cheap coal-supplies refine imported sugar, *e.g.*, London, Liverpool, Bristol and Greenock. Aluminium is made in Inverness at the Falls of Foyers.

769. Local hides are used in the tanneries of Stafford, Leicester and Northampton, and—on a smaller scale—those of Devon and Ayr; the great London tanneries depend mainly upon imported hides. Large boot, shoe and other leather works are found at Leicester and Northampton, and in various Staffordshire towns. Gloves are made at Worcester, Hereford, Woodstock, Taunton and Yeovil. Norwich manufactures locally-grown mustard, and the wheat-straw of the Great Ouse basin is made into hats at various towns, notably at Luton. The demands of stock-rearing and convenient oil-seed imports have induced large oil-cake industries in Ulster and Yorkshire. Exceptionally pure water explains the dye-works of Perth.

770. **Communications.**—Three great lines connect London with Edinburgh and Glasgow (Fig. 138): (a) the **London and North-Western** to Carlisle, whence the Caledonian runs north-west, branching at Carstairs; (b) the **Midland**, to Carlisle, the North British completing the connection to Edinburgh, *via* Hawick, and the Glasgow and South-Western to Glasgow, *via* Kilmarnock; (c) the **Great Northern**, connecting with the **North-Eastern** at Doncaster, the North British completing the connection from Berwick. Important branches run from Rugby, Crewe, Derby, and other large centres. These include branches (a) to Holyhead (for Dublin and Greenore); (b) to Grimsby (for the fish traffic); (c) to Fleetwood and Heysham (for Belfast); (d) to Stranraer (for the short crossing to Larne).

771. The **Great Central** runs to Manchester and Liverpool, with important branches to Lincoln and Grimsby; the **Great Western** to Penzance, with branches to Birkenhead, Milford Haven and Fishguard, now an important trans-Atlantic passenger and mail port, and to Weymouth; and the **London and South-Western** to Devonport, with branches to Portsmouth, Southampton and Weymouth. The **Great Eastern** runs to Yarmouth, with an important branch to Harwich, for fish and Continental traffic. The **South-Eastern and Chatham** runs to Folkestone and Dover, for the Continental traffic, with a branch to Queenborough (for Flushing); and the **London, Brighton and South Coast** serves Newhaven (for Dieppe).

772. In addition to the Scottish lines already mentioned [775-6], the **North British** connects Edinburgh with Perth, Dundee and Aberdeen, *via* the Forth and Tay Bridges; and with Glasgow, *via* Falkirk. The **Caledonian** connects Glasgow with Edinburgh, and

both cities with Aberdeen and Dundee, *via* Stirling and Perth. The **Glasgow and South-Western** runs from Glasgow to Stranraer; the **Highland**, from Perth to Inverness, and thence to Wick and Thurso; and the **Great North of Scotland** connects Aberdeen with Fraserburgh, Banff, Elgin and other northern towns. The chief Irish lines are (a) the **Great Southern and Western**, from Dublin to Cork, with branches to Limerick and Waterford; (b) the **Midland Great Western**, from Dublin to Galway and Sligo; (c) the **Dublin, Wicklow and Wexford**, with connections to Rosslare (for Fishguard) and Waterford; (d) the **Great Northern**, from Dublin to Belfast and Londonderry; (e) the **Northern Counties**, from Belfast to Larne (for Stranraer), and to Londonderry.

773. **Rivers.**—The largest vessels ascend the Thames for fifty miles to London, and barges reach Lechlade; the lower Avon admits large steamers at high tide to Bristol, and the Severn, by the aid of the Berkeley Ship Canal, to Gloucester, barges ascending the latter river to Welshpool. Sea-going vessels reach Goole, on the Yorkshire Ouse, and Gainsborough, on the Trent, which takes barges to Burton. The Shannon, serving the unproductive Irish interior, is navigable to the head of Lough Allen. The Clyde, formerly a mere stream, now takes ocean steamers to Glasgow, and the Forth and Tay are navigable to Stirling and Perth respectively.

774. **Canals.**—British inland waterways cannot compare with Continental; but the proposed development of four great trunk waterways to connect the chief Midland cities with the four chief English estuaries should be of great industrial and commercial importance. Birmingham (525,833), the fifth city, would be the centre of the system. The **Manchester Ship Canal**,

35½ miles long, takes 28-foot vessels, and the **Berkeley Ship Canal** makes Gloucester a seaport.

775. The **Forth and Clyde Canal**, from Grangemouth to Bowling, is extensively used, and the construction of a ship-canal has been discussed from time to time; the **Caledonian**, though 17 feet deep, is practically confined to tourist traffic. In Ireland, Dublin is connected with the Shannon by two canals—the **Grand** and the **Royal**—a branch of the former connecting with Athy, the head of navigation on the Barrow. The **Ulster Canal** connects Belfast with the head-waters of the Shannon *via* Lough Neagh, and with Donegal Bay *via* Loughs Neagh and Erne; and the **Newry Canal** is a useful highway from Lough Neagh to the Newry River.

776. **Chief Ports.**—Most British ports enjoy a great natural advantage in the abnormal height of the tides, due to the shallowness of the surrounding seas and the length and narrowness of the estuaries; and this will also be of incalculable economic value to the country when the problem of the adaptation of tide-power to industrial use has been solved [45]. **London** (4,521,685)¹ is the greatest port in the world, its total tonnage being one-third greater than that of Liverpool [Fig. 150], though, in the volume of their foreign trade, the two ports are almost equal. London's largest trade is with Australasia and the East. Its position, at the head of steam navigation on a river whose estuary faces those of the Rhine, Maas and Scheldt, and with easy communication inland over the whole of the productive English plain, guaranteed it increasing importance as a market, a port and an entrepôt centre [739], and

¹ The population of Greater London in 1911 was 7,251,358, or almost one-sixth of the entire population of Britain.

made it the natural capital and the chief railway centre.

777. Liverpool (746,421), the third city and second

LONDON	25.1	15.0
LIVERPOOL WITH BIRKENHEAD	23.3	7.8
CARDIFF	18.0	7.2
NEWCASTLE WITH N.E.S. SHIELDS	15.7	7.9
SOUTHAMPTON	13.3	2.1
GLASGOW	7.9	4.5
HULL	9.1	2.6
PLYMOUTH	7.6	1.8
7.4 CORK		1.2
4.9 NEWPORT	2.4	
4.5 MID'BRO	2.3	
1.0 BELFAST	5.8	
4.9 SWANSEA	1.8	
3.6 SUNG'D	3.1	
5.2 GRIMSBY	0.8	

port, became the natural port for industrial Lancashire because of its splendid situation on the Mersey. It is now the chief port in the trade with America, cotton, grain and cattle being the chief imports; and it receives large shipments of dairy produce from Ireland. Birkenhead (130,794) is really a suburb. **Cardiff** (182,259) follows Liverpool in tonnage, but the nature of its trade, *e.g.*, coal especially, renders it much less valuable. **Newcastle** (266,603) is the fourth port in tonnage, but, like Cardiff, and for similar reasons, in value of trade it ranks behind many smaller ports. North and South Shields and Gateshead are virtually suburbs.

FIG. 150.—UNITED KINGDOM—CHIEF PORTS: TOTAL TONNAGE IN MILLIONS OF TONS, ARRIVED AND DEPARTED, WITH CARGOES AND IN BALLAST DURING 1913.

(Foreign trade unshaded, coasting trade shaded.)

778. Southampton (119,012), the fifth port, has mainly a mail and passenger traffic with the Americas and South Africa, owing to its possessing the nearest good harbour to London. It enjoys the unique advantage of having four tides daily, the obstruction offered to the tidal wave by the Isle of Wight causing a second inflow by the eastern channel. **Glasgow** (784,496), the sixth

port in tonnage and the fourth in value, and the second city in the country, is the industrial and commercial capital of Scotland, with a great variety of industries attracted by its coal and iron, ship-building [769] and

engineering being the chief. Standing at the head of ocean navigation on the canalised Clyde, with easy access inland to all parts of industrial and agricultural Scotland, it was certain to become, like London, a great market, port and railway centre. Its chief trade is with America. **Hull** (277,991), though but the seventh port in tonnage, follows London and Liverpool in the value of its trade. Its excellent situation on the only navigable waterway between the Thames and the Tees, facing the Elbe estuary, the Kiel Canal, and the richest North Sea fishing banks, and with easy communication inland to all parts of industrial Yorkshire, has given it enormous commercial importance.

779. **Plymouth** (112,030), the eighth port, grew where the Tamar estuary penetrates the rich Dartmoor mineral region; and the magnificent situation led to the establishment of a great naval harbour at Devonport. **Cork**, important mainly through its mail and passenger trade with America, is now threatened by the growth of Fishguard, whose more convenient harbour is safer for great modern liners. **Newport** (Monmouth), like Cardiff, has a large trade in coal, iron and West African produce. **Middlesborough** (104,767) owes its importance to the intrusion of a navigable waterway into a great iron and salt area with convenient coal. **Belfast** (386,947), the eighth city, has a small *direct* foreign trade [Fig. 150], much of its produce being shipped to America *via* Glasgow and Liverpool.

780. **Swansea** (114,663) serves a large mining, and industrial area producing coal, iron and copper. **Sunderland** (151,159) grew where an estuary penetrated a great coal-field. **Grimsby** has already been mentioned [753]. It has a large general trade, to develop which new docks have been opened at Immingham.

Manchester (714,333), the fourth city, has grown rapidly as a port since the construction of the Ship Canal. **Salford** (231,357) is practically a suburb.

781. **Other Ports.** — **Bristol** (357,048) has grown since its docks were made available for large vessels. It imports mainly tobacco from America, cacao and sugar from the West Indies and South America, and provisions and dairy produce from Ireland. **Leith** serves Edinburgh. Harwich, Dover, Folkestone and Newhaven handle imports of perishable goods, and light wares, *e.g.*, silks, gloves and watches. Dublin ships live-stock and dairy produce to England, as do also Belfast, Cork, Waterford, Limerick, Londonderry, Wexford, Dundalk and Drogheda. American vessels call at Moville for Londonderry.

782. Certain leading towns show remarkable recent increases in population. Liverpool, Belfast and Cardiff have increased over 100 per cent. in thirty years, and Manchester, Hull, Newcastle and Middlesbrough show increases of from 75 to 100 per cent.; while the population of Rhondda has been almost trebled.

QUESTIONS

121. Explain why British imports consistently exceed the exports.

122. How is Britain's industrial growth reflected in the foreign trade?

123. Give reasons for the commercial predominance of Britain.

124. Why has London become the largest city in the world?

125. On a blank map of Britain indicate the chief regions producing (a) wheat; (b) dairy products; (c) coal.

126. Explain the importance of Glasgow, Liverpool, Manchester, Belfast, Birmingham, Leeds, Sheffield, Hull, Grimsby and Middlesbrough.

127. On a blank physical map of Britain insert the chief railways.

128. At London the mean annual rainfall is 25 inches, the mean July temperature 64° , and the mean January temperature 38° , the corresponding figures for Cork being 41 inches, 60° and 44° . Compare in general terms the climates of the two places, giving reasons for the differences shown.

129. The climate of Britain is temperate and the land is productive, while Labrador, in the same latitude, is mainly tundra. Why?

130. In what way might peat influence the future of Ireland?

131. Where and why are the following industries important in Britain: (a) ship-building; (b) cotton; (c) wool; (d) linen; (e) jute; (f) linoleum; (g) chemicals; (h) brewing; (k) straw hats; (l) tinplate.

132. Though Cardiff is the third port in tonnage and Newcastle the fourth, both fall far below many smaller ports in the *value* of their trade. Why?

INDEX OF CHIEF REFERENCES

Subjects are indicated by italics, and more important pages by heavy figures. Abbreviations: *c.*, canal; *i.*, island; *l.*, lake; *m.*, mountain; *r.*, river; *v.*, valley.

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